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SOUTHERN COMPANY

February 27, 2013

Docket Nos.: 50-348
50-364

NL-13-0213

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

Joseph M. Farley Nuclear Plant – Units 1 and 2
Southern Nuclear Operating Company's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number EA-12-049, *Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,* dated March 12, 2012

2. NRC Interim Staff Guidance JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, Revision 0, dated August 29, 2012

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

4. Southern Nuclear Operating Company letter NL-12-2145 to the NRC, *Joseph M. Farley Nuclear Plant - Units 1 and 2 Southern Nuclear Operating Company's 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 23, 2012

Ladies and Gentlemen:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Southern Nuclear Operating

Company (SNC). Reference 1 was immediately effective and directs SNC 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 (ISG) (Reference 2) was issued August 29, 2012, and 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 Joseph M. Farley Nuclear Plant's (FNP) 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 SNC 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 the enclosure provides the FNP 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 the Enclosure, will be provided in the 6-month Integrated Plan updates required by Reference 1.

SNC intends to fully implement the requirements of the Order by breaker closure of the Unit 1 Spring 2015 refueling outage and the Unit 2 Fall 2014 refueling outage per Section IV, Condition A.2 of Reference 1. In accordance with Section IV, Condition C.3 of Reference 1, SNC intends to submit notification to the NRC that full compliance of the Order has been achieved within 60 days of full implementation for each unit at FNP.

This letter contains no new regulatory commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Respectfully submitted,

B. L. Ivey
Vice President – Regulatory Affairs

BLI/CLN

Mr. B. L. Ivey states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Sworn to and subscribed before me this 27th *day of* February, *2013.*

Nancy Louise Henderson
Notary Public

My commission expires: March 23, 2014

Enclosure: Joseph M. Farley Nuclear Plant Units 1 and 2 Mitigation Strategies for Beyond-Design-Basis External Events Overall Integrated Implementation Plan

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
Mr. T. A. Lynch, Vice President – Farley
Mr. B. J. Adams, Vice President – Fleet Operations
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U. S. Nuclear Regulatory Commission
Mr. E. J. Leeds, Director of Office of Nuclear Reactor Regulation
Mr. V. M. McCree, Regional Administrator
Ms. E. A. Brown, NRR Project Manager - Farley
Mr. P. K. Niebaum, Senior Resident - Farley
Mr. J. R. Sowa, Senior Resident – Farley
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
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Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

Joseph M. Farley Nuclear Plant – Units 1 and 2
Southern Nuclear Operating Company's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

Enclosure

Joseph M. Farley Nuclear Plant Units 1 and 2 Mitigation Strategies for Beyond-Design-Basis External Events Overall Integrated Implementation Plan

Southern Nuclear Operating Company

J. M. Farley Nuclear Plant

Units 1 & 2

Mitigating Strategies (FLEX)

Overall Integrated Implementation Plan

Revision 0, February 27, 2013

Table of Contents

Introduction

The Nuclear Regulatory Commission (NRC) issued Order EA-12-049, *Issuance of Order to Modify Licenses with Regard to Mitigation Strategies for Beyond-Design-Basis External Events*, on March 12, 2012. This order imposes the need for guidance and strategies to prevent fuel damage in the reactor and spent fuel pool (SFP) with a loss of power, motive force and normal access to the Ultimate Heat Sink (UHS) which affect all units at a site simultaneously. The Order is based on Recommendation 4.2 of SECY-11-0093, *Recommendations for Enhancing Reactor Safety in the 21st Century, the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident.*

NRC Order EA-12-049 requires a three-phased approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment integrity, and SFP inventory. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely. The three-phased approach outlined by the NRC is consistent with the industry proposal for a Diverse and Flexible Mitigation Capability (FLEX). The Order also requires submittal of an overall integrated plan which will provide a description of how the requirements of the Order will be achieved.

The NRC provided additional details of an acceptable approach for complying with Order EA-12-049 with Interim Staff Guidance (ISG) (JLD-ISG-2012-01) issued in August 2012. The ISG endorses the FLEX approach presented in NEI 12-06 Revision 0, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, with clarifications.

This integrated plan provides the J. M. Farley Nuclear Plant (FNP) Units 1 and 2 approach for complying with Order EA-12-049 using the methods described in NRC JLD-ISG-2012-01. Six month progress reports will be provided consistent with the requirements of Order EA-12-049 and the guidance in NEI 12-06.

General Integrated Plan Elements (PWR & BWR)	
Section 1: Determine Applicable Hazards	
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.*

The applicable extreme external hazards for Farley Nuclear Plant (FNP or Farley) are seismic, ice, high winds and high temperature as detailed below:

Seismic Hazard Assessment:

Per the Farley Unit 1 (FNP-1) and Farley Unit 2 (FNP-2) Final Safety Analysis Report (FSAR) (Reference 1) Section 2.5, the seismic criteria for FNP include two design basis earthquake spectra: Operating Basis Earthquake (OBE) and the Safe Shutdown Earthquake (SSE). The OBE and the SSE are 0.05g and 0.10g, respectively; these values constitute the design basis of FNP. Per Nuclear Energy Institute (NEI) 12-06 Section 5.2 (Reference 2), all sites will consider the seismic hazard.

Thus the Farley site screens in for an assessment for seismic hazard.

External Flood Hazard Assessment:

Not applicable, as Farley is built above the design basis flood level. Per Farley FSAR Chapter 2 the Probable Maximum Flood (PMF) stage is 144.2 ft mean sea level (msl) without wave runup; with wave runup due to 153.3 ft. (Reference 1). The grade level of safety-related structures at Farley is 154.5 ft. Therefore, Farley is built above the design basis flood level and is considered a dry site by the NEI guidance (Reference 2, Section 6.2.1). Farley does not have to characterize a flood or evaluate protection and deployment of FLEX strategies.

Thus, the Farley site screens out for an assessment for external flooding.

Extreme Cold Hazard Assessment:

The guidelines provided in NEI 12-06 (Reference 2, Section 8.2.1) generally exclude the need to consider extreme snowfall at plant sites in the southeastern U.S. below the 35th parallel. The Farley plant site is located at 31°13′ N latitude and 85°06′ W longitude (Reference 1, Section 2.1.1). Thus, the capability to address hindrances caused by extreme snowfall with snow removal equipment need not be provided.

According to FSAR Section 2.4.7, there is no record of the Chattahoochee River icing over. Therefore, there is no risk of ice blockage, frazil ice, or loss of UHS due to ice. The Farley site is located within the region characterized by Electric Power Research Institute (EPRI) as ice severity level 4 (Reference 2, Figure 8-2). As such, the Farley site is subject to severe icing conditions.

Thus, the Farley site screens in for an assessment for extreme cold for ice only.

High Wind Hazard Assessment:

Plant Farley is located at 31°13′ N latitude and 85°06′ W longitude (Reference 1, Section 2.1.1). Per NEI 12-06 guidance, hurricanes and tornado hazards are applicable to Farley. NEI 12-06 (Reference 2,

Figures 7-1 and 7-2) was used for this assessment.

Thus, the Farley site screens in for an assessment for High Wind Hazard.

Extreme High Temperature Hazard Assessment:

Per NEI 12-06 Section 9.2, all sites will address high temperatures. The climate at the site is typical of that in the Southern Gulf Coastal Plain, being hot and humid in the summer and mild in the winter. The Farley site normal daily maximum temperature ranges from 63°F in January to 92°F in June through August. An extreme maximum of 107°F was recorded in Blakely and 104°F in Dothan. The maximum temperature exceeds 90ºF on about 100 days a year at Dothan and 89 days a year at Blakely (Reference 1, Section 2.3.2.2).

Thus, the Farley site screens in for an assessment for extreme High Temperature.

Summary of Extreme External Hazards Assessments:

The hazards applicable to FNP are seismic, ice, high winds, and high temperature.

References:

1. Joseph M. Farley Nuclear Plant Unit 1 & 2 Final Safety Analysis Report (FSAR), Revision 24, August 2012
2. Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, NEI 12-06, Revision 0, August 2012

Section 2: Key Site Assumptions

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.*

Key assumptions associated with implementation of FLEX Strategies for FNP are described below:

- 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 and submitted, appropriate issues will be entered into the corrective action system and addressed.
- The following conditions exist for the baseline case:
  - Seismically designed DC battery banks are available.
  - Seismically designed AC and DC distribution is available.
  - Plant initial response is the same as Station Blackout (SBO) event.

- Best estimate analysis and decay heat are used to establish operator time and action.
- No single failure of SSC is assumed except those in the base assumptions (i.e., EDG operation). Therefore, TDAFW will perform either via automatic control or with manual operation capability per the guidance in NEI 12-06.

- The designed hardened connections are protected against external events or are established at multiple and diverse locations.
- FLEX components will be designed to be capable of performing in response to the "screened in" hazards in accordance with NEI 12-06. Portable FLEX components will be procured commercially.
- Margin will be added to design FLEX components and hard connection points to address future requirements as re-evaluation warrants. This margin will be determined during the detailed design or evaluation process.
- Phase 2 FLEX components stored at the site will be protected against the "screened in" hazards in accordance with NEI 12-06. At least N sets of equipment will be available after the event they were designed to mitigate.
- Deployment strategies and deployment routes will be assessed for hazards impact.
- Additional staff resources are expected to begin arriving at 6 hours and the site will be fully staffed 24 hours after the event.
- Maximum environmental room temperatures for habitability or equipment availability is based on NUMARC 87-00 (Reference 1) guidance if other design basis information or industry guidance is not available. Extreme high temperatures are not expected to impact the utilization of off-site resources or the ability of personnel to implement the required FLEX strategies.
- This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink resulting from a beyond-design-basis event by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures (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/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p) (Reference 3).

Exceptions for the site security plan or other (license/site specific) requirements of a nature requiring NRC approval will be communicated in a future 6 month update following identification.

Open items where SNC does not have clear guidance to complete an action related to this submittal are listed below:

1. Structure, content and details of the Regional Response Center playbook will be determined.

References:

1. NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Revision 1
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
3. 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).

Section 3: Deviations to JLD-ISG-2012-01 and NEI 12-06

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.*

SNC has no known deviations to the guidelines in JLD-ISG-2012-01 and NEI 12-06. If deviations are identified, then the deviations will be communicated in a future 6 month update following identification.

Section 4: Sequence of Events and Technical Basis

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)*

Discussion of time constraints identified in Attachment 1A table.

- 30 minutes, Entry into Extended Loss of AC Power (ELAP) (table item 4) - Time critical at a time greater than 40 minutes. Time period of 40 minutes is selected conservatively to ensure that ELAP entry conditions can be verified by control room staff and it is validated that emergency diesel generators (EDG) are not available. 40 minutes is a reasonable assumption for system operators to perform initial evaluation of the EDGs. Entry into ELAP provides guidance to operators to perform ELAP actions. A formal validation of the timeline will be performed once the procedure guidance is developed and related staffing study is completed.
- 35 minutes, Stage portable Control Room Lighting (table item 5) - Time critical at a time greater

than 45 minutes. Time period of 5 minutes past ELAP entry is selected to ensure that control room portable lighting is established prior to the extended load shed de-energizing the emergency control room lighting. A formal validation of the timeline will be performed once the procedure guidance is developed and related staffing study is completed.

- 50 minutes, DC extended load shed complete (table item 6) - Time critical at a time greater than 1 hour. Time period of 20 minutes past ELAP entry is selected to ensure that DC buses are available from battery sources. Phase 2 battery recharging is assumed to begin at 8 hours (table item 8); The DC buses are readily accessible to the operator. Load stripping consists of opening 11 breakers on Unit 1 and 10 breakers on Unit 2 using local control switches. As an operator aid, the breakers/ control switches will be appropriately identified (labeled) to show which are required to be opened to facilitate an extended load shed (Reference 6). From the time that ELAP conditions are declared, it is reasonable to expect that operators can complete the DC bus load shed in approximately 20 minutes. A formal validation of the timeline will be performed once the procedure guidance is developed and related staffing study is completed.
- 2 hours, TDAFW manual pump operation using existing instructions provided in Auxiliary Feedwater System operating procedure (table item 7) - Time critical at 2 hours. The TDAFW UPS and batteries provide power for a minimum of 2 hours for automatic or remote manual operation of TDAFW pump and turbine (Reference 7). In addition, the TDAFW turbine steam admission valves will remain open for at least 2 hours utilizing compressed air from the associated air accumulator (Reference 7). After 2 hours operator action is required to manually open the TDAFW turbine steam admission valves, and then manually control TDAFW turbine speed by throttling open the TDAFW trip and throttle valve to control turbine speed and pump discharge pressure.
- 8 hours, Power up both trains of station Class 1E DC power via battery chargers powered by an onsite FLEX Diesel Generator (table item 8) - Time critical after 8.5 hours. Current battery durations are calculated to be greater than 8.5 hours. The on-site FLEX diesel generator (DG) will be deployed during the 6-8 hour time frame to power the battery chargers by 8 hours. The onsite FLEX Diesel Generator will also be connected to power the Mode 1-4 RCS FLEX pump within 14 hours or the Mode 5-6 RCS FLEX pump within 12 hours, dependent on ELAP initial conditions. The on-site FLEX DGs will be maintained in on-site FLEX storage structures. The on-site FLEX DGs will be transferred and staged via haul routes and staging areas evaluated for impact from external hazards. Modifications to connect credited loads will be implemented to facilitate the connections and operational actions required to supply the battery chargers and RCS FLEX pumps from the on-site FLEX DGs. Programs and training will be implemented to support operation of on-site FLEX DGs.
- 10 hours, Initiate depressurization of the steam generators to achieve the RCS cooldown and depressurization (table item 10) - Time critical at 15 hours. Initiating cooldown at 16 hours allows sufficient time for RCS depressurization (estimate 4 hours) prior to when borated makeup must be started (table item 12) for maintaining sub-criticality at the most limiting core conditions (Reference 3).
- 12 hours, Makeup to CST from RMWST (table item 11) – Time critical at approximately 12.5 hours. Prior to depletion, the CST will be provided with makeup from the Reactor Makeup Water Storage Tank (RMWST) which is Seismic Category 1 and missile protected. The RMWST contains demineralized water with a minimum inventory of 160,000 gallons that is capable of

providing an additional 24.5 hours to the 12.5 hours (Reference 6) of available inventory in the CSTs.

- 14 hours, Initiate boration of the RCS to ensure the reactor is maintained subcritical (table item 12) - Time critical at approximately 19 hours. The Westinghouse RCS makeup evaluation for FNP (Reference 3) determined that injecting approximately 5000 gallons from the Boric Acid Storage Tank (BAST/BAT) provides sufficient shutdown margin for the worst case boration requirements (i.e., end-of-life). Initiating makeup from the BAST/BAT at 19 hours ensures adequate boration to maintain long-term sub-criticality is accomplished within 24 hours (i.e., prior to addition of net positive reactivity from xenon decay and cooldown following the reactor trip) with injection rate limited by letdown through the upper head vent flowpath (Reference 6).
- 36 hours, Makeup to CST from offsite water source (table item 14) - Time critical at approximately 37 hours. Prior to depletion of the initial CST inventory and supplemental RMWST inventory, the CST will require makeup from the service water pond (UHS) through portable water treatment equipment (filtration/demineralizer plant) from the Regional Response Center (RRC) that will furnish a makeup water source to the CST sufficient to remove decay heat from the steam generators.

<u>Technical Basis Support information</u>

1. On behalf of the Pressurized Water Reactor Owners Group (PWROG), Westinghouse developed a document (WCAP-17601-P, Revision 0 (Reference 1)) to supplement the guidance in NEI 12-06 by providing additional PWR-specific information regarding the individual plant response to the Extended Loss of AC Power (ELAP) and loss of Ultimate Heat Sink (UHS) events. The document includes identification of the generic event scenario and expected plant response, the associated analytical bases and recommended actions for performance of a site-specific gap analysis. Guidance regarding plant response for core cooling, containment integrity, and spent fuel pool cooling is generally applicable to all Westinghouse PWRs, including FNP Units 1 and 2. Supplementary guidance (Reference 2) was utilized as appropriate to develop Core Cooling and RCS Inventory coping strategies and for prediction of the plant's response. The NSSS vendor has performed a site specific evaluation (Reference 3) associated with RCS makeup and boration requirements for Farley.
2. FNP containment integrity for Phases 1 through 3 will be evaluated by use of computer code MAAP 4.05.
3. At FNP, the motor driven and turbine driven AFW pump discharge headers provide a flow path to all steam generators. The physical location of these discharge headers results in only one header being available for modification.
4. Environmental conditions within the station areas will be evaluated utilizing methods and tools in NUMARC 87-00 (Reference 5) or Gothic 8.0 (EPRI software).
5. Per the guidance in 10 CFR 50.63 and Regulatory Guide 1.155, FNP is an alternate AC, 4 hour coping plant for Station Blackout (SBO) considerations (Reference 5, Section 8.3.1.1.7.3). Applicable portions of the analysis described in the FNP FSAR have been used as starting points for evaluations performed to meet the guidance from NEI 12-06 (Reference 6). Key assumptions not addressed in the EA-12-049 order were per the existing SBO evaluations. Some of these SBO

based assumptions used for ELAP are:

a) Credit is taken for operator actions where appropriate.
b) Equipment needed for the SBO coping duration is available at the site once Phase 2 is implemented.
c) There is reasonable assurance that the equipment will remain operable during and subsequent to an SBO event.

References:

1. WCAP-17601-P, “Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs”.
2. LTR-PSCA-12-78, PA-PSC-0965 Core Team PWROG Core Cooling Management Interim Position Paper, Revision 0, November 2012.
3. LTR-FSE-12-25 Revision 1, “Evaluations to Support SNC FLEX Strategies for Farley Nuclear Plant,” January 21, 2013.
4. NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Revision 1.
5. Farley Nuclear Plant Final Safety Analysis Report (FSAR), Revision 25.
6. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
7. A181010, Ver. 23.0, Functional System Description Auxiliary Feedwater System.
8. FNP-1-ECP-0.0, Ver. 26.0, Loss of All AC Power
9. FNP-2-ECP-0.0, Ver. 26.0, Loss of All AC Power

Section 5: Strategies Deployment

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.*

The FNP deployment strategy will be included within an administrative program.

- FNP procedures and programs will be developed in accordance with NEI 12-06 to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.
- Routes for transporting FLEX equipment from storage location(s) to deployment areas will be developed as the FLEX storage facility details are identified and finalized.
- The identified haul paths and deployment areas will be accessible during all modes of operation. The administrative program will have elements to ensure pathways will be kept clear or will require actions to clear the pathways.
- The chosen pathways will be evaluated for applicable hazards associated with the areas utilized for the deployment path or storage locations for phase 2.

Section 6: Milestone Schedule

Provide a milestone schedule. This schedule	*The dates specifically required by the order*

<table>
<tr><td colspan="2">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</td><td>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 attached milestone schedule Attachment 2</td></tr>
<tr><td colspan="3">See attached milestone schedule in Attachment 2.</td></tr>
<tr><td colspan="3">Section 7: Programmatic Controls</td></tr>
<tr><td>Identify how the programmatic controls will be met.

Ref: NEI 12-06 Section 11
JLD-ISG-2012-01 Section 6.0</td><td colspan="2">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.</td></tr>
<tr><td colspan="3">FNP will implement an administrative program for implementation and maintenance of the FNP FLEX strategies in accordance with NEI 12-06 guidance.

• Equipment quality: The equipment for ELAP will have unique identification numbers. Installed structures, systems and components pursuant to 10CFR50.63(a) will continue to meet the augmented quality guidelines of Regulatory Guide 1.155, Station Blackout.
• Equipment protection: FNP will construct structures to provide protection of the FLEX equipment to meet the requirements identified in NEI 12-06 section 11. The schedule to construct the structures is still to be determined.
• Storage and deployment: FNP will develop procedures and programs to address storage structure requirements and deployment/haul path requirements relative to the hazards applicable to FNP.
• Maintenance and Testing: FNP will utilize the standard EPRI industry PM process (Similar to the Preventive Maintenance Basis Database) for establishing the maintenance and testing actions for FLEX components. The administrative program will include maintenance guidance, testing procedures and frequencies established based on type of equipment and considerations made within the EPRI guidelines.
• Design Control: FNP will follow the current programmatic control structure for existing processes such as design and procedure configuration.</td></tr>
</table>

<table>
<tr><th colspan="2">Section 8: Training Plan</th></tr>
<tr><td>Describe training plan</td><td>List training plans for affected organizations or describe the plan for training development</td></tr>
<tr><td colspan="2">New training of station staff and emergency response personnel will be performed in 2014, prior to the 1st FNP unit design implementation. These programs and controls will be implemented in accordance with the Systematic Approach to Training or other standard plant training processes where applicable.</td></tr>
<tr><th colspan="2">Section 9: Regional Response Plan</th></tr>
<tr><td>Describe Regional Response Center plan</td><td>Discussion in this section may include the following information and will be further developed as the Regional Response Center development is completed.
▪ Site-specific RRC plan
▪ Identification of the primary and secondary RRC sites
▪ Identification of any alternate equipment sites (i.e. another nearby site with compatible equipment that can be deployed)
▪ Describe how delivery to the site is acceptable
▪ Describe how all requirements in NEI 12-06 are identified</td></tr>
<tr><td colspan="2">FNP will utilize the industry Regional Response Centers (RRC) for Phase 3 equipment. FNP has contractual agreements in place with the Strategic Alliance for FLEX Emergency Response (SAFER). The two (2) industry RRC will be established to support utilities in response to beyond design-basis external events (BDBEE). 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. Communications will be established between the affected nuclear site and the SAFER team and required equipment mobilized as needed. Equipment will initially be moved from an RRC to a local staging area established by the SAFER team and the utility. The equipment will be prepared at the staging area prior to transportation to the site. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.</td></tr>
<tr><td colspan="2">Notes:

None</td></tr>
</table>

Section 10: 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**

Maintain Core Cooling & Heat Removal: 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 (AFW/EFW) and strategy(ies) utilized to achieve this coping time.

Coping Strategy (Modes 1 through 4, and Mode 5 with Steam Generators Available)

Immediately following the ELAP event, reactor core cooling is accomplished by natural circulation of the Reactor Coolant System (RCS) through the steam generators and cooled by the Auxiliary Feedwater (AFW) system, and steam pressure will be controlled by the Main Steam Safety Valves (MSSVs) assuming compressed air is not available for operation of the Atmospheric Relief Valves (ARVs). This primary core cooling strategy relies on the Turbine-Driven Auxiliary Feedwater (TDAFW) pump, which will be automatically actuated within 1 minute of a loss of AC power, to provide feedwater for the removal of reactor core decay heat following a loss of main feedwater (Reference 1).

The TDAFW pump supplies flow to all three steam generators through individual air-operated flow control valves (FCVs). Control of the FCVs, if compressed air is available, as well as manual speed control for the TDAFW pump, is provided in the control room. Since the compressed air system is non-seismic, manual operation of the FCVs is required throughout the ELAP. The TDAFW UPS and batteries provide for two hours of automatic operation of TDAFW. In addition, the turbine steam admission valves will remain open for two hours utilizing compressed air from the associated air accumulator. After two hours, operator action is required to manually open the steam admission valves and then manually control TDAFW turbine speed by throttling open the TDAFW trip and throttle valve to control turbine speed and pump discharge pressure per existing procedural guidance.

Feedwater supply to the TDAFW pump is from the Condensate Storage Tank (CST). Each CST (one per unit) is nominally a 500,000 gal tank; however, only the bottom 164,832 gallons is Seismic Category 1 and missile protected (Reference 2). However, the CST volume credited for ELAP is 150,000 gallons of demineralized water for each unit (Reference 3). Based on this minimum volume of water available in the CSTs, along with core decay heat and RCS sensible heat removal requirements for cooldown to 350°F; the protected inventory of the CST is available to provide flow to the steam generators for approximately 13 hours.

Coping Strategy (Mode 6 and Mode 5 without Steam Generators Available)

In the initial phase without the steam generators available, core cooling is accomplished by

[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.

Section 10: Maintain Core Cooling & Heat Removal

maintaining RCS inventory. Refer to the Phase 1 RCS Inventory Control strategy.

References:

1. A181010, Ver. 23.0, Functional System Description Auxiliary Feedwater System.
2. BM-95-0961-001, Ver. 5.0, Verification of CST Sizing Basis
3. Farley Nuclear Plant Final Safety Analysis Report (FSAR), Revision 25.
4. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications and describe how they support coping time.*

Label non-critical DC loads to allow operators to more readily identify the loads that will be shed during the Phase 1 extended load shedding activity.

Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Steam Generator Essential Instrumentation	**Safety Function**
SG Level (LI 474, 475, 476, LI 484, 485, 486, and LI 494, 495, 496) (Reference 1 and 2)	Core Cooling
SG Pressure (PI-474, 475, 476), PI-484, 485, 486, and PI-494, 495, and 496) (Reference 1 and 2)	Core Cooling
AFW Flow to SGs (FE-3229A, B, & C)	Core Cooling
Condensate Storage Tank Essential Instrumentation	**Safety Function**
CST Level (LI-515 and LI-516) (Reference 1 and 2)	Core Cooling
Reactor Coolant System Essential Instrumentation	**Safety Function**
RCS T-Cold (TI-412D, TI-422D, and TI-432D) (Reference 1 and 2)	Core Cooling
RCS T-Hot (TI-412B, TI-422B, and TI-432B) (Reference 1 and 2)	Core Cooling

Section 10: Maintain Core Cooling & Heat Removal

RCS Wide Range Pressure (PI-0402 and PI-403) (Reference 1 and 2)	Core Cooling
Core Exit Thermocouples (TE-2301 through TE-2351 on Unit 1 and TE-2301 through TE-2349 on Unit 2 as available per Technical Specifications) (Reference 1, 2, and 3)	Core Cooling
Reactor Neutron Flux Essential Instrumentation	**Safety Function**
Source Range Neutron Flux (N31/N32) (Reference 1 and 2)	Reactivity Control

FNP will have the following instruments remain available following DC Bus extended load shed:

- Steam Generator Pressure
- Steam Generator Level
- AFW Flow to SGs
- RCS T-cold
- RCS T-hot
- RCS WR Pressure
- DC Bus Voltage

Analysis (Reference 1) indicates this strategy provides required instrumentation for at least eight (8) hours.

FNP expects to also have the following instruments available in Phase 2 and beyond; however, these instruments are not considered essential for Phase 1:

- Core Exit Thermocouples
- Source Range Neutron Flux

In addition, local indications such as CST tank level will remain available and the Key Reactor Parameters can be determined from a local reading using standard I&C instruments.

Notes:

None

References:

1. OG-12-515, Final PWROG Generic FLEX Support Guidelines and Interfaces (Controlling Procedure Interface and Recommended Instruments), Revision 0, December 2012.
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
3. Farley Units 1 and 2 Technical Specifications, Amendment No. 188 (Unit 1) and Amendment No 183 (Unit 2)

Section 10: Maintain Core Cooling & Heat Removal

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.

Coping Strategy (Modes 1 through 4, and Mode 5 with Steam Generators Available)

Primary Strategy

Actions are required during Phase 2 following the ELAP event for reactor core cooling. The main strategy will be dependent upon the continued operation of the TDAFW pump, which is capable of feeding the steam generators as long as there is an ample steam supply to drive the TDAFW pump turbine. Phase 2 has several other baseline coping capabilities that it must be able to achieve based on the guidance of NEI 12-06.

Alternate Strategy

Phase 2 requires a baseline capability for reactor core cooling strategy to connect a portable pump for injection into the steam generators in the event that the TDAFW pump fails or when ample steam is no longer available to drive the TDAFW pump's turbine. To allow for defense-in-depth actions in the event of an unforeseen failure of the TDAFW pump, the SG FLEX pump should be staged and made ready for service as soon as resources become available following the ELAP event.

To utilize the SG FLEX pump, the coping strategy depressurizes the steam generators to below the SG FLEX pump discharge pressure. Depressurization of the steam generators will require deploying shift operators (SOs) to locally open the Atmospheric Relief Valves (ARVs). The SOs, coordinating with the MCR will depressurize the steam generators via the ARVs to a pressure of approximately 300 psig. To conservatively envelop any scenario with an early TDAFW failure and provide the capability to restore secondary heat sink, the SG FLEX pump will be sized based on decay heat at one hour after reactor shutdown. This corresponds to a flow rate of approximately 300 gpm (Reference 1) at a discharge pressure equal to the specified steam generator injection pressure, 300 psig, in addition to all head losses (i.e., hoses, piping, connections and elevation of feed injection point) from the discharge of the SG FLEX pump to the steam generator.

Throughout Phase 2, it is expected that the TDAFW pump or the SG FLEX pump will be in operation with suction from the CST and discharge to the steam generators. For injection using the SG FLEX Pump, the pump would normally be staged at a location near the CST. The supply source for the SG FLEX pump will be the CST and the discharge of the SG FLEX pump will be directed to the discharge piping of the AFW pumps on the 100' elevation.

As stated previously, the CST is capable of providing a minimum of 12.5 hours of water for steam generator injection (applicable to both TDAFW pump injection and SG FLEX Pump injection into SGs). A transfer pump, hereafter identified as the CST FLEX pump, will be provided for CST makeup. The makeup strategy for the CST is first to supply water from the Reactor Makeup Water Storage Tank (RMWST). The RMWST is a Seismic Category 1 tank and is missile protected. The RMWST contains demineralized water with a minimum inventory of 160,000 gallons that is capable of providing an additional 24.5 hours to the 12.5 hours of available inventory in the CST.

Section 10: Maintain Core Cooling & Heat Removal

At Farley, the motor driven and turbine driven AFW pump discharge headers provide a flow path to all steam generators. The physical location of these discharge headers results in only one header being available for modification. Since the discharge header is cross-connected to all three steam generators, adding multiple connections to this header provides no additional redundancy. The strategy at Farley will be to provide the primary and alternate diverse injection points connections accessible from ground level (155' elevation) for convenience and reliability during connection of the portable pump. These diverse connections will then merge inside the Auxiliary Building and form a seismically qualified FLEX feedwater header. This FLEX feedwater header will be routed to the general area of the AFW system connection. Hose to provide the final connection from the FLEX feedwater header to the AFW piping will be stored in the vicinity of these connection points.

Coping Strategy (Mode 6 and Mode 5 without Steam Generators Available)

The primary strategy for core cooling without the steam generators available in the transitional phase is to maintain RCS inventory. Refer to the Phase 2 RCS Inventory Control strategy.

Onsite FLEX Diesel Generator

To provide support for the core cooling coping strategy following an ELAP event, a 600V AC diesel generator will be staged and connected to power select loads. The loads that will be powered by this onsite FLEX Diesel Generator include a battery charger to each class 1E 125 VDC Switchgear, accumulator discharge isolation valves, and RCS FLEX pump (Mode 1-4 or Mode 5-6, as needed). The onsite FLEX Diesel Generator is further described in the Safety Function Support section. Diverse connection points will be provided.

References:

1. WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs".
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for Phase 2*

1. Install quick connect points on the 155' elevation and appropriate transfer switches, to allow energizing required plant electrical loads from the onsite FLEX Diesel Generator. Required loads include the plant battery chargers, accumulator isolation valves, and either the Mode 1-4

Section 10: Maintain Core Cooling & Heat Removal

RCS FLEX or Mode 5-6 RCS FLEX pump.

2. Install diverse suction connections and fill connections on each CST. Diverse suction and fill connection locations for seismic category 1 water storage tanks are needed to comply with NRC Order EA-12-049. Requires use of hose to pipe adapters to be normally stored in the FLEX warehouse(s). Install a connection point on the discharge piping of the AFW pumps on the 100' elevation of the Auxiliary Building and extend piping from this location to two diverse connections accessible from the 155' elevation for connecting the SG FLEX pump. Tie-ins to the system piping will be via flexible hose during the event. New piping for SG injection utilizing the SG FLEX pump is needed to meet the strategy implementation time constraints.
3. Install a robust, shielded connection on each RMWST that extends through the RMWST shield building providing two diverse connections for transferring the RMWST inventory to the CST. This requires use of hose to pipe adapters to be normally stored in FLEX warehouse(s).

Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Same as instruments listed in Maintain Core Cooling & Heat Removal, Phase 1

Phase 2 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

Storage / Protection of Equipment:
Describe storage / protection plan or schedule to determine storage requirements

Seismic	*List how equipment will be protected or scheduled to protect*

Permanent piping systems used to provide water from the storage tanks to the plant is seismically qualified. Installation of new pipes and equipment used to provide core cooling and heat removal to the SG will be installed seismically rugged and protected or in structures that are seismically rugged or qualified. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06 Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit.

FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.

Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level	*List how equipment will be protected or scheduled to protect*

Not applicable per NEI 12-06 as outlined within the first section of this Integrated Plan.

Section 10: Maintain Core Cooling & Heat Removal	
Severe Storms with High Winds	*List how equipment will be protected or scheduled to protect*
The piping and connection points used to provide core cooling and heat removal to the SG will be contained within buildings that are protected or they will be designed for protection from storms and high winds. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06 Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Snow, Ice, and Extreme Cold	*List how equipment will be protected or scheduled to protect*
The piping used to provide core cooling and heat removal to the SG will be contained within buildings that are protected or they will be designed for protection from snow, ice, and extreme cold. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06 Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
High Temperatures	*List how equipment will be protected or scheduled 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 per Reference 1. The schedule to construct structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	

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 will be protected*
Storage location and structure have not yet been decided. After the building	No modifications identified for Phase 2 deployment issues.	• Plant piping and valves for FLEX connections will be missile protected and enclosed within a Seismic

Section 10: Maintain Core Cooling & Heat Removal		
design and location are finalized, the deployment routes will be evaluated for external hazards to demonstrate a clear deployment path.		Category 1 or seismically 'rugged' structure, which will inherently protect it from local hazards such as vehicle impact. • Diverse connection points for CST fill capability from the FLEX pumps will be provided with at least one connection point protected from tornado missiles. • New FLEX piping shall be installed to meet necessary seismic requirements. • Connection points for the SG and CST FLEX pumps will be designed to withstand the applicable hazards. • Electrical connection points for the onsite FLEX DGs will be designed to withstand the applicable hazards.

Notes:

None

References:

1. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012.
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

Section 10: Maintain Core Cooling & Heat Removal

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.

Coping Strategy (Modes 1 through 4, and Mode 5 with Steam Generators Available)

Phase 3 of the core cooling strategy will be expected to begin following exhaustion of the CSTs and RMWSTs at approximately 37 hours. The Phase 3 core cooling strategy for steam generator will be provided by a SW FLEX pump capable of providing the entire inventory of water from the Service Water Pond (UHS) through RRC water treatment equipment and then to the CST. Prior to depletion of the UHS, there will be the capability to refill the UHS from the Chattahoochee River via temporary equipment from off-site.

The subsequent Phase 3 core cooling strategy requires heat removal equipment delivered from the RRC and a pump capable of removing heat from the reactor core in addition to other loads from the SFP and containment. The flow paths for decay heat removal would utilize piping in the RHR system and Component Cooling Water (CCW) system. Establishing RHR cooling would require repowering the RHR pump via a diesel generator delivered from the RRC to establish recirculation in the RCS. Heat removal would be through the RHR heat exchangers. The RHR heat exchangers would subsequently be cooled by flow from the CCW system. The CCW system would be cooled and circulated by an offsite heat exchanger and pump system powered from the RRC provided diesel generator. The CCW system can be isolated so that a portable system can provide cooling to not only the RHR heat exchangers but the SFP heat exchangers and RHR pump seal coolers as well. The RRC heat exchanger would be sized to remove all decay heat from irradiated fuel located in the reactor cores and SFPs.

Prior to depletion of the CST and RMWST inventory at approximately 37 hours, a new source of water for feeding the steam generators will be provided to supply the CST by processing water from the Service Water Pond (UHS) through water treatment equipment provided by the Regional Resource Center.

Coping Strategy (Mode 6 and Mode 5 without Steam Generators Available)

In modes without the steam generators available for decay heat removal (Modes 5 and 6), it will be necessary to use the Phase 3 RRC heat exchanger and pump system discussed above in Modes 1 through 4.

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
2. WCAP-17601-P, “Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs”.

Details:

Section 10: Maintain Core Cooling & Heat Removal

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for Phase 3*

Provide supply and return connections for the CCW system to allow for connection of the RRC pump/heat exchanger system to allow for removal of heat from RHR system, SFP Cooling system, and RHR pump coolers.

Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Same as instruments listed in Maintain Core Cooling & Heat Removal Phase 1.

Phase 3 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

Deployment Conceptual Designs
(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 will be protected*
Phase 3 equipment will be provided by the Regional Response Center (RRC). Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored. After the building design and location are finalized, the deployment routes, including deployment routes for off-site RRC equipment will be evaluated for external hazards to demonstrate a clear deployment path.	No modifications identified for Phase 3 deployment issues.	• Plant piping and valves for FLEX connections will be missile protected and enclosed within a Seismic Category 1 or seismically ‘rugged’ structure, which will inherently protect it from local hazards such as vehicle impact. • Connection points on the CCW system for connection of RRC pump and heat exchanger system will be protected from tornado missiles. • All other equipment will be portable.

Notes: None

Section 10: Maintain Core Cooling & Heat Removal

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1
2. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012

Section 11: 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**

Maintain RCS Inventory Control: PWR Installed Equipment Phase 1

Provide a general description of the coping strategies using installed equipment including [3] 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.

Coping Strategy (Modes 1 through 4, and Mode 5 with Steam Generators Available)

In order to maintain sufficient reactor coolant system (RCS) inventory, an evaluation of BDBEEs resulting in an ELAP has concluded that core uncovery will not occur at Farley until well after 7 days (Reference 5). This analysis was conservatively based on the current safe shutdown/low leakage RCP seal design with total RCS leakage of 4 gpm (1 gpm seal leakage from each of 3 reactor coolant pumps (Reference 1, Reference 2) plus 1 gpm from unidentified RCS sources). The Westinghouse RCS makeup evaluation for FNP (Reference 3) demonstrates that RCS makeup will be required at 29 hours to maintain single phase RCS core cooling using the steam generators. If credit is taken for two-phase RCS core cooling using the steam generators, RCS makeup is not required until after 72 hours. However, RCS makeup will be required for supplemental boron addition for reactivity control.

In preparation for RCS inventory control and long term sub-criticality, the phase 1 action will be to cool down and depressurize the RCS for injection of boron and coolant inventory via the SI accumulators. As the RCS is cooled, the level within the RCS will occupy less volume and will require makeup and boron. This borated makeup volume will be injected from the SI accumulators during normal RCS cooldown following an ELAP event. Prior to injection of the entire SI accumulator inventory, the SI accumulators will be isolated if necessary to avoid nitrogen injection into the RCS, which has the potential to inhibit natural circulation. Procedural guidance for isolating of the SI accumulators will be provided by emergency operating procedures (Reference 5). The Phase 2 RCS Inventory strategy is discussed later.

Coping Strategy (Mode 6 and Mode 5 without Steam Generators Available)

In Mode 5 without the steam generators available, manual action will be required to provide makeup to the RCS via gravity feed from the Seismic Category 1 Refueling Water Storage Tank (RWST). A concrete shield wall around the RWST ensures that tank is protected from missiles. Prior to entering Mode 5, the RWST contains a minimum borated water inventory of 471,000 gallons (Reference 4). Prior to transferring the RWST inventory to the reactor refueling cavity, gravity feed is available with this inventory in the RWST in Mode 5 until a pressure of approximately 30 psig is reached in the RCS and is accomplished via manual valve operation. Gravity feeding to the RCS is currently included in

[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.

[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.

Section 11: Maintain RCS Inventory Control

plant procedures at FNP. In Mode 6, the RWST inventory is available in the reactor refueling cavity for core cooling and no Phase 1 actions are required.

The required makeup flow rate to the RCS following a loss of residual heat removal (RHR) cooling is 100 gpm (Reference 3). While gravity feeding may not achieve the required flow rate necessary to makeup to the RCS short term or long term, it is still a credited action that will mitigate uncovering the core. It is expected that a Phase 2 strategy will be required; however, the initial response of gravity feeding from the RWST should extend the required Phase 2 response time to prevent uncovering the core.

<u>References</u>:

1. Vendor Manual U258242, Farley Unit 1 Instruction Manual – Controlled Leakage Seal Reactor Coolant Pump
2. Vendor Manual U214849, Farley Unit 2 Instruction Manual – Controlled Leakage Seal Reactor Coolant Pump
3. LTR-FSE-12-25 Revision 1, "Evaluations to Support SNC FLEX Strategies for Farley Nuclear Plant," January 21, 2013.
4. Farley Units 1 and 2 Technical Specifications, Amendment No. 188 (Unit 1) and Amendment No 183 (Unit 2)
5. WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs"
6. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications and describe how they support coping time.*

No modifications are required to cope with RCS Inventory and Reactivity Control during Phase 1.

Section 11: Maintain RCS Inventory Control

Key Reactor Parameters	*List instrumentation credited for this coping evaluation.*

Reactor Coolant System Essential Instrumentation	**Safety Function**
RCS T-Cold (TI-412D, TI-422D, and TI-432D) (Reference 1and 2)	Core Cooling
RCS T-Hot (TI-412B, TI-422B, and TI-422B)(Reference 1and 2)	Core Cooling
RCS Wide Range Pressure (PI-0402 and PI-403) (Reference 1and 2)	Core Cooling
Pressurizer Level (LI-459, 460, 461, and 462) (Reference 1and 2)	RCS Inventory
Reactor Vessel Level Indication (Reference 11and 2)	RCS Inventory
Reactor Neutron Flux Essential Instrumentation	**Safety Function**
Source Range Neutron Flux (N31/N32) (Reference 1and 2)	Reactivity Control

Notes:

FNP will have the following instruments remain available following DC Bus extended load shed:

- RCS T-cold
- RCS T-hot
- RCS WR Pressure
- Pressurizer Level

Analysis (Reference 1) indicates this strategy provides required instrumentation for at least eight (8) hours.

FNP expects to also have the following instruments available in Phase 2 and beyond; however, these instruments are not considered essential for Phase 1:

- Reactor Vessel Level Indication
- Source Range Neutron Flux

References:

1. OG-12-515, Final PWROG Generic FLEX Support Guidelines and Interfaces (Controlling Procedure Interface and Recommended Instruments), Revision 0, December 2012.
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

Section 11: Maintain RCS Inventory Control

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.

Coping Strategy (Modes 1 through 4, and Mode 5 with Steam Generators Available)

For RCS inventory control and long term sub-criticality in Phase 2, the credited action will be to cooldown and depressurize the RCS for injection of boron and coolant inventory from first the accumulators, and then Phase 2 RCS FLEX pumps. Depressurizing the RCS to inject the accumulator occurs when the steam generators are depressurized to 300 psig. The heat removed by depressurizing the steam generators also cools the RCS to a T_{avg} of approximately 425°F and a RCS pressure of 305 psig at saturation conditions (Reference 1).

Following injection of the accumulators' inventory, the accumulators are isolated by closing the accumulator discharge valves to avoid nitrogen injection into the RCS due to subsequent plant cooldown and depressurization. Due to the low leakage seals, it is not anticipated that additional makeup other than that of the accumulators will be required to maintain adequate RCS inventory until Phase 3. However, based on plant specific Westinghouse analysis (Reference 2), injection of borated water needs to occur beginning approximately 14 hours after the ELAP/LUHS event occurs to ensure sub-criticality will be maintained. This will be accomplished using a Mode 1-4 RCS FLEX pump sized to inject borated water at the rate of 30 gpm at approximately 500 psig. The primary borated water source is approximately 2,000 gallons of highly borated water available in each Boric Acid Storage Tank (BAST/BAT) (Technical Requirements Surveillance 13.1.6.6). The alternate water source is the large volume (471,000 gals) of borated water inventory available in the RWST for RCS injection. The Mode 1-4 RCS FLEX pump will be pre-staged in the auxiliary building to allow ease of access and installation. The Mode 1-4 FLEX pump will be powered from the onsite FLEX Diesel Generator when installed. Primary and alternate connections for the discharge of the Mode 1-4 RCS FLEX pump into the RCS will be provided.

Coping Strategy (Mode 6 and Mode 5 without Steam Generators Available)

The primary strategy for core cooling without the steam generators available will be to utilize an onsite FLEX pump for RCS injection, hereafter referred to as the Mode 5-6 FLEX RCS pump. This pump will be pre-staged on the 100' elevation of the auxiliary building and will be powered from the onsite FLEX Diesel Generator when installed. The source of the injection water is the RWST. Primary and alternate suction connection points will be provided. The primary and alternate discharge connection points for the Mode 5-6 FLEX RCS pump will be two locations downstream of the charging pump discharge header. The Westinghouse site specific makeup and boration analysis for Farley (Reference 2) indicates that a flow rate of 100 gpm will be sufficient to remove the decay heat for Mode 5 and 6 events that occur beyond 48 hours after plant shutdown.

<u>Onsite FLEX Diesel Generator</u>

To provide support for the RCS inventory control (including RCS boration) coping strategy following an ELAP event, a 600V AC diesel generator will be staged and connected to power select loads. The loads that will be powered by this onsite FLEX Diesel Generator include a battery charger to each class

Section 11: Maintain RCS Inventory Control

1E 125V DC Switchgear, accumulator discharge isolation valves, and RCS FLEX pump (Mode 1-4 or Mode 5-6, as needed). The FLEX DG will have diverse connection points. The onsite FLEX Diesel Generator is further described in the Safety Function Support section.

References:

1. WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs".
2. LTR-FSE-12-25 Revision 1, "Evaluations to Support SNC FLEX Strategies for Farley Nuclear Plant," January 21, 2013.
3. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for Phase 2*

1. Provide a modification; including quick connect points on the 155' elevation and appropriate transfer switches, to allow energizing required plant electrical loads from the onsite FLEX Diesel Generator. Required loads include the plant battery chargers, accumulator isolation valves, and either the Mode 1-4 RCS FLEX or Mode 5-6 RCS FLEX pump.
   (NOTE: This same modification is listed in the Core Cooling & Heat Removal Phase 2 section.)
2. Install connection points downstream of the charging pump discharge header for connecting the Mode 1-4 RCS FLEX pump for reactivity control and RCS inventory control or Mode 5-6 RCS FLEX pump for core cooling and RCS inventory control.
3. Install new cabling with receptacles for powering Mode 1-4 RCS FLEX pump or Mode 5-6 RCS FLEX pump at an easily accessible location on the Auxiliary Building 100' elevation. Disconnects will be powered from the onsite FLEX Diesel Generator via 600V AC FLEX switchgear.
4. Provide suction connection for Mode 1-4 RCS FLEX pump at the Boric Acid Storage Tanks (BAST/BATs) for reactivity control and RCS inventory control.
5. Provide suction connection for Mode 1-4 RCS FLEX pump or Mode 5-6 RCS FLEX pump from the RWST supply line to the hydrostatic test pump for reactivity control, RCS inventory control, and core cooling.

Section 11: Maintain RCS Inventory Control	
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same as instruments listed in Maintain RCS Inventory Control, Phase 1. Phase 2 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment will be protected or scheduled to protect*
Permanent piping systems used to provide water from the storage tanks to the plant is seismically qualified. Installation of new pipes and equipment used to provide RCS Inventory Control will be installed seismically rugged and protected in structures that are seismically rugged or qualified. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Flooding	*List how equipment will be protected or scheduled to protect*
Not applicable per NEI 12-06 as outlined within the first section of this Integrated Plan.	
Severe Storms with High Winds	*List how equipment will be protected or scheduled to protect*
The piping used to provide RCS Inventory Control will be contained within buildings that are protected or designed for protection from storms and high winds. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Snow, Ice, and Extreme Cold	*List how equipment will be protected or scheduled to protect*
The piping used to provide RCS Inventory Control will be contained within buildings that are protected or designed for protection from snow, ice, and extreme cold. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049	

Section 11: Maintain RCS Inventory Control	
implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
High Temperatures	*List how equipment will be protected or scheduled 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 per Reference 1. The schedule to construct structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	

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 will be protected*
Pump and hoses are stored in a Class 1 structure.	Provide storage locations on the 100' elevation of the Auxiliary building for the Mode 1-4 RCS FLEX pump, Mode 5-6 RCS FLEX pump, and associated connection piping/hoses.	• Diverse connection points will be provided downstream of the charging pump discharge header for injection from the RCS FLEX pumps. Connections will be enclosed within a Seismic Category 1 structure. • Connection points will be provided on the BAST/BAT discharge piping and RWST supply line (hydro pump line) to supply the RCS FLEX pumps. Connections will be enclosed within a Seismic Category 1 structure. • New FLEX piping/ connections will be installed to meet necessary seismic requirements. • Electrical connection points from the onsite FLEX Diesel Generator to the RCS FLEX pumps will be designed and installed to withstand the applicable hazards.

Section 11: Maintain RCS Inventory Control

Notes:

None

References:

1. WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs".
2. LTR-FSE-12-25 Revision 1, "Evaluations to Support SNC FLEX Strategies for Farley Nuclear Plant," January 21, 2013.
3. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
4. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012.

Section 11: Maintain RCS Inventory Control

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.

For RCS Inventory Control in Phase 3, boron mixing equipment (delivered from off-site) will be employed to supplement the RWST inventory if necessary. Injection to the RCS will be continued through the connection(s) downstream of the charging pump discharge header. Refer to the Phase 2 RCS Inventory Control strategy.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for Phase 3*

No modifications required for the Phase 3 RCS Inventory Control strategy.

Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Same as instruments listed in Maintain RCS Inventory Control, Phase 1.

Phase 3 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

Section 11: Maintain RCS Inventory Control		
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 will be protected*
Phase 3 equipment will be provided by the Regional Response Center (RRC). Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored. After the building design and location are finalized, the deployment routes, including deployment routes for offsite RRC equipment will be evaluated for external hazards to demonstrate a clear deployment path.	No modifications identified for Phase 3 deployment issues.	All equipment will be portable.

Notes:

None

References:

1. WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, and Babcock & Wilcox NSSS Designs".
2. LTR-FSE-12-25 Revision 1, "Evaluations to Support SNC FLEX Strategies for Farley Nuclear Plant," January 21, 2013.
3. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
4. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012.

Section 12: Maintain Containment

Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

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

Maintain Containment: 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.

Analysis is being performed to demonstrate that containment response following a postulated ELAP/ LUHS event does not challenge design limits until well after availability of RRC equipment and implementation of long term strategies to control pressure and temperature. See Phase 3 discussion.

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1
2. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012.

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.*

No procedures, strategies, or guidelines are required for the Phase 1 Containment strategy.

Identify modifications	*List modifications and describe how they support coping time.*

No modifications required for the Phase 1 Containment strategy.

Key Containment Parameters	*List instrumentation credited for this coping evaluation.*

Containment System Essential Instrumentation	Safety Function
CTMT Pressure (PI-950, 951, 952, and 953) (Reference 1 and 2)	Containment Integrity

Notes:

None

References:

[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.

Section 12: Maintain Containment

1. OG-12-515, Final PWROG Generic FLEX Support Guidelines and Interfaces (Controlling Procedure Interface and Recommended Instruments), Revision 0, December 2012.
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012

Section 12: Maintain Containment

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 core cooling. Identify methods (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time.

Portable on-site FLEX Diesel Generators will be employed (as discussed in Core Cooling Phase 2 section) to charge the station batteries and maintain DC bus voltage for continued availability of required instrumentation.

Analysis is being performed to demonstrate that containment response following a postulated ELAP/ LUHS event does not challenge design limits until well after availability of RRC equipment and implementation of long term strategies to control pressure and temperature. See Phase 3 discussion.

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
2. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for Phase 2*

Provide a modification; including quick connect points on the 155' elevation and appropriate transfer switches, to allow energizing required plant electrical loads from the onsite FLEX Diesel Generator. Required loads include the plant battery chargers, accumulator isolation valves, and either the Mode 1-4 RCS FLEX or Mode 5-6 RCS FLEX pump.
(NOTE: This same modification is listed in the Core Cooling Phase 2 section.)

Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Same as instruments listed in Maintain Containment, Phase 1.

Section 12: Maintain Containment	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment will be protected or scheduled to protect*
Connections for FLEX DG will be installed seismically rugged and protected or in structures that are seismically rugged or qualified. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Flooding	*List how equipment will be protected or scheduled to protect*
Not applicable per NEI 12-06 as outlined within the first section of this Integrated Plan.	
Severe Storms with High Winds	*List how equipment will be protected or scheduled to protect*
Connections for FLEX DG will be contained within buildings that are protected or designed for protection from storms and high winds. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Snow, Ice, and Extreme Cold	*List how equipment will be protected or scheduled to protect*
Connections for FLEX DG will be contained within buildings that are protected or designed for protection from snow, ice, and extreme cold. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	

Section 12: Maintain Containment		
High Temperatures	*List how equipment will be protected or scheduled 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 per Reference 1. The schedule to construct structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.		
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 will be protected*
Storage location and structure have not yet been decided. After the building design and location are finalized, the deployment routes will be evaluated for external hazards to demonstrate a clear deployment path.	No modifications identified for Phase 2 deployment issues.	Electrical connection points from the onsite FLEX Diesel Generator to the RCS FLEX pumps on the 100' elevation will be designed and installed to withstand the applicable hazards.

Notes:

None

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
2. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012.

Section 12: Maintain Containment

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 coping strategy required for maintaining containment integrity involves either venting containment or using containment coolers for indefinite containment cooling.

Primary Strategy

The preferred option is to repower Train A containment cooling fans at low speed and supply a new source of cooling water. The cooling water to these containment coolers will be provided by isolating the service water system upstream and downstream of the containment coolers. Cooling water flow through the containment coolers will be provided by a portable pump and heat exchanger skid from the RRC. Modification is required to provide connection points to the service water lines and this strategy provides a Train A electrical powered alternative.

Alternative Strategy

The containment venting strategy will be achieved by repowering the Post-LOCA Pressurization and Ventilation System. This system provides a filtered ventilation path to vent the containment atmosphere to the stack and provides a Train B electrical powered alternative.

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

2. NEI 12-06, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide”, Rev. 0, August 2012.

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for Phase 3*

1. Install supply and return connections of the Train A containment cooler service water piping outside containment to supply supplemental cooling to the containment fan coolers.
2. Provide supply and return connections for the CCW system to allow for connection of the RRC

Section 12: Maintain Containment		
pump/heat exchanger system to allow for removal of heat from RHR system, SFP Cooling system, and RHR pump coolers.		
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.*	
Same as instruments listed in Containment Phase 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 will be protected*
Phase 3 equipment will be provided by the Regional Response Center (RRC). Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored. After the building design and location are finalized, the deployment routes, including deployment routes for offsite RRC equipment will be evaluated for external hazards to demonstrate a clear deployment path.	No modifications identified for Phase 3 deployment issues.	• Connection points on the containment fan coolers' service water line is housed within a Seismic Category 1 structure. • All other equipment will be portable.
Notes: None		

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1
2. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012

Section 13: Maintain Spent Fuel Pool Cooling	
Determine Baseline coping capability with installed coping[5] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Makeup with Portable Injection Source**	
Maintain Spent Fuel Pool Cooling: 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 . Fuel in the spent fuel pool is cooled by maintaining water above the top of the fuel. Upon interruption of power to the installed SFP cooling pumps, the water inventory will heat up. Requirements for SFP makeup (which are not required until boil-off occurs in the SFPs) are based on the worst case design basis heat load and worst case fuel offload timing. In this scenario, the pool will start boiling at 5.6 hours after cooling is lost; however, water does not drop to 15 feet above the fuel for greater than 23 hours and active fuel is not uncovered for 53.1 hours (Reference 1). Makeup flow of 76.7 gpm (Reference 2)per pool will be required to maintain level for this worst case design basis heat load ELAP/LUHS event. The only Phase 1 action identified will be to open the spent fuel pool room door and the new fuel room missile door to ventilate the spent fuel pool room to mitigate the steam caused by spent fuel pool boiling. This pathway will be established by manually propping open the missile door (East missile door or the new fuel area missile door) and propping open the door to the spent fuel pool room. The new fuel area door is locked and closed during normal operations. Security and radiation protection personnel will be needed to open the door. Propping open these doors provides a ventilation pathway in addition to a pathway for laying hoses. References: 1. SM-95-0721-015, Ver. 2.0, Spent Fuel Pool Thermal Analyses – Licensing Bases 2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1	
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.*
SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.	
Identify modifications	*List modifications and describe how they support coping time.*

[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.

Section 13: Maintain Spent Fuel Pool Cooling	
Modification to install SFP Level instrumentation per EA-12-051 response.	
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.*
SFP Level per EA-12-051 response (Reference 1)	

Notes:
None

References:

1. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1

Section 13: Maintain Spent Fuel Pool Cooling

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.

To ensure minimum spent fuel pool level will be maintained, makeup to the spent fuel pool will be implemented prior to the spent fuel pool water level reaching 15 feet above the active fuel as indicated by the installed SFP level instrumentation. This timing depends on the stored fuel inventory and time since fuel was discharged from the core, but in all cases will be greater than 23 hours.

Since the SFP is designed so that it does not require borated water to maintain subcritical conditions, the Service Water Pond is the preferred source of makeup for SFP boiloff.

Four baseline capabilities related to SFP level are specified in the NEI 12-06 guidance, 3 for makeup and 1 for venting the SFP area. The venting of the SFP area capability is discussed in Phase 1.

Primary Strategy Method 1 - spent fuel pool makeup via hoses directly into the spent fuel pool,

Primary Strategy Method 2 - spent fuel pool makeup via a connection to SFP cooling piping or other alternate location that does require accessing the spent fuel pool room,

Primary Strategy Method 3 - a vent pathway for steam caused by spent fuel pool boiling (as described in the Spent Fuel Pool Cooling Phase 1 section), and

Primary Strategy Method 4 - spray capability via portable monitor nozzles.

Prior to spent fuel pool makeup being required, staging hoses for providing the makeup will be accomplished. This strategy consists of installing hoses for makeup and spray on each unit. A manifold will be provided to connect three hoses: one that discharges directly into the SFP (Method 1), one that can provide makeup to the SFP through the SFP Cooling system (Method 2), and one that can supply the monitor spray nozzles (Method 4).

The required flow to satisfy the spray capability for each units' SFP via portable monitor nozzles is 250 gpm as established in NEI 12-06 (Table D-3). This flow rate is bounding for all other SFP cooling baseline capabilities. The manifold described above will be supplied by one hose connected to the discharge of a pump deployed at the Service Water Pond. The minimum flow rate for the SFP FLEX pump is 250 gpm to each unit.

References:

1. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012
2. SM-95-0721-015, Ver. 2.0, Spent Fuel Pool Thermal Analyses – Licensing Bases
3. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1

Details:

Provide a brief description of Procedures / Strategies /	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure/ strategy/ guideline.*

Section 13: Maintain Spent Fuel Pool Cooling

Guidelines	
SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.	
Identify modifications	*List modifications and describe how they support coping time.*
Install a connection on the Spent Fuel Pool Cooling system's heat exchanger discharge line to allow makeup to be supplied to the SFP without accessing the SFP area during an ELAP/LUHS event. Another modification is to install SFP Level instrumentation per EA-12-051 response.	
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.*
Same as instruments listed in Spent Fuel Pool Cooling, Phase 1. Phase 2 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment will be protected or scheduled to protect*
Connections for FLEX equipment will be installed seismically rugged and protected or in structures that are seismically rugged or qualified. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Flooding	*List how equipment will be protected or scheduled to protect*
Not applicable per NEI 12-06 as outlined within the first section of this Integrated Plan.	
Severe Storms with High Winds	*List how equipment will be protected or scheduled to protect*
Connections for FLEX equipment will be contained within buildings that are protected or designed for protection from storms and high winds. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the	

Section 13: Maintain Spent Fuel Pool Cooling	
implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Snow, Ice, and Extreme Cold	*List how equipment will be protected or scheduled to protect*
Connections for FLEX equipment will be contained within buildings that are protected or designed for protection from snow, ice, and extreme cold. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06 Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
High Temperatures	*List how equipment will be protected or scheduled to protect*
Connections for FLEX equipment will be contained within buildings that are protected or designed for protection from high temperatures. Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized per Reference 1. The schedule to construct structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	

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 will be protected*
Storage location and structure have not yet been decided. After the building design and location are finalized, the deployment routes will be evaluated for external hazards to	No modifications identified for Phase 2 deployment issues.	Plant piping and valves for FLEX connections will be enclosed within a Seismic Category 1 structure, which will inherently protect it from local hazards such as vehicle impact. All other connections and equipment will be portable.

Section 13: Maintain Spent Fuel Pool Cooling		
demonstrate a clear deployment path.		

Notes:

None

References:

1. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1

Section 13: Maintain Spent Fuel Pool Cooling	
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. *Coping Strategy* The long-term phase of the FLEX cooling strategy is reliant on moving from makeup/boil-off to making use of the flow through the SFP heat exchanger that will be cooled by the portable RRC pump and heat exchanger skid. The SFP cooling pump will be powered to provide the motive force for the water through the SFP Heat Exchanger. The SFP can be cooled indefinitely using the portable RRC pump and heat exchanger skid.	
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.*
SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.	
Identify modifications	*List modifications necessary for Phase 3*
No modifications required for the Spent Fuel Pool Cooling, Phase 3 strategy.	
Key SFP Parameter	*Per EA 12-051*
Same as instruments listed in Spent Fuel Pool Cooling, Phase 1. Phase 3 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.	

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection will be protected*
Strategy	**Modifications**	**Protection of connections**
Phase 3 equipment will be provided by the Regional Response Center (RRC). Equipment transported to the site	No modifications required for deploying the Phase 3 strategy.	1. Connection point for makeup to the SFP Cooling system will be enclosed within a Seismic Category 1 structure, which will inherently

Section 13: Maintain Spent Fuel Pool Cooling		
will be either immediately staged at the point of use location (pumps and generators) or temporarily stored. After the building design and location are finalized, the deployment routes, including deployment routes for offsite RRC equipment will be evaluated for external hazards to demonstrate a clear deployment path.		protect it from local hazards such as vehicle impact. 2. All other connections and equipment will be portable.

Notes:

None

References:

1. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1

Section 14: Safety Functions Support

Determine Baseline coping capability with installed coping[6] modifications not including FLEX modifications.

Safety Functions Support: 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.

Main Control Room Accessibility

Main Control Room (MCR) accessibility must be maintained for the duration of the extended loss of all AC power (ELAP). During the ELAP, some control room vital electronics, instrumentation and emergency lighting remain energized from emergency DC power sources. At one hour, extended load shedding will be complete and some instrumentation and the emergency lights are de-energized. Battery powered emergency lighting will illuminate portions of the MCR once the extended load shedding is completed. Emergency lights and required instrumentation are reenergized in Phase 2 when the battery charger will be powered from the onsite FLEX Diesel Generator. The room heat-up calculations performed for SBO conditions need to be revised to envelop the effect of this de-energizing/reenergizing sequence on control room accessibility following an ELAP event.

On the basis of similar studies for other plants, it is reasonable to assume that there will be sufficient sensible heat, heat from personnel and the limited electrical loads still active during Phase 1 of an ELAP to increase the room temperature above the 110°F value assumed for the maximum temperature for efficient human performance as described in NUMARC 87-00 (Reference 1). The Phase 1 strategy is thus to block open the MCR access doors open to the building exterior at plant grade level) and employ portable ventilation fans powered by electric generators or gas powered portable fans. This strategy will provide enough ventilation to equalize the MCR temperature to approximately that of the outside air. During cold weather, the ventilation flow can be limited to keep the MCR at a habitable temperature. The Phase 1 strategy can be extended indefinitely or until long term Phase 3 strategies to restore plant HVAC equipment or provide portable HVAC for the MCR can be implemented. If the outside temperature is above 98°F, then the doors will not be opened until the MCR temperature is in excess of the outside temperature. Note that on the infrequent days when the peak daily outside temperature is above 98°F, this temperature is normally only exceeded for a limited time during the early afternoon hours. In addition, there is on average a 22.7°F difference between the daily high and low temperatures (Reference 5, Table 2.3-4).

TDAFW Pump Room Accessibility

The core cooling strategies rely on operation of the TDAFW pump during all phases of the event. During operation, there is a considerable heat load within the room from the steam turbine and associated piping. Operation of TDAFW without forced ventilation was evaluated for the SBO condition by calculation BM-96-1171-001 (see Reference 2). This conservative calculation (ignored heat sinks and heat transfer out of the room) determined that with no ventilation, the room would heat

[6] 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.

Section 14: Safety Functions Support

up to 123°F during the first hour of the SBO coping period and remain below 125 °F during the initial 24 hours. Plant operations personnel determined that these conditions were satisfactory for intermittently accessing the TDAFW pump room. Site industrial safety procedures currently address activities with a potential for heat stress to prevent adverse impacts on personnel.

Battery and DC Equipment Room Accessibility

During battery charging operations in Phases 2 and 3 in support of maintaining power to instrumentation and controls for core cooling, containment, and SFP cooling functions, ventilation will be required in the battery rooms and associated DC equipment rooms for cooling the rooms and venting hydrogen released from the batteries during charging. Until power can be provided to the normal room ventilation system, the doors will be manually propped open. If necessary, forced ventilation can then be established using portable fans (electric powered from the on-site FLEX DG powering the battery chargers).

Auxiliary Building 100 ft. elevation Accessibility

The SG FLEX Pump backup feed connections, as well as the Mode 1-4 and Mode 5-6 RCS FLEX Pumps connections, are in this area. Temperature in these areas will remain low enough so as to not impact accessibility or equipment operation given the heat load and building size.

Communications

The communication plan for FNP in response to an ELAP will rely on elements of the NTTF recommendation 9.3 emergency preparedness communication assessment performed in response to the March 12, 2012 NRC letter entitled, "Request for Information Pursuant to Title 10 of the Code of 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." The request for information asked that licensees assess their current communications systems and equipment during a large scale natural event and loss of all alternating current power. On October 31, 2012, FNP committed to actions to address communication items identified in the assessment (Reference 4).

For Phase 1 communication coping, the plant PA System will be modified to provide reasonable protection and battery backup, and will assist with initial notifications and directions to on-site personnel, the on-shift Emergency Response Organization (ERO) personnel, and in-plant response personnel. Battery operated satellite phones will assist with initial notifications and directions to off-site Emergency Response Organization (ERO) personnel and other personnel. The battery operated satellite phones will be maintained in a charged condition and will not be dependent on the availability of power, or onsite or off-site infrastructure.

References:

1. NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Revision 1
2. BM-96-1171-001, Ver. 0.0, Determine Temperature Profile in TDAFW Pump Room with Loss of Ventilation.
3. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.
4. SNC Letter to NRC on Emergency Preparedness Communication Assessment dated October

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31, 2012 as requested by NRC Letter, Request for Information Pursuant to Title 10 of the Code of 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 Daiichi Accident, dated March 12, 2012 (NL-12-2068)

5. Joseph M. Farley Nuclear Plant Units 1 & 2 Final Safety Analysis Report (FSAR), Revision 24, August 2012

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications and describe how they support coping time.*

No modifications required for the Safety Functions Support, Phase 1 strategy.

Key Parameters	*List instrumentation credited for this coping evaluation phase.*

1E Battery Bus Essential Instrumentation	**Safety Function**
Voltage Indication (DC Buses A and B) (Reference 1 and 2)	Safety Function Support

Notes:

None

References:

1. OG-12-515, Final PWROG Generic FLEX Support Guidelines and Interfaces (Controlling Procedure Interface and Recommended Instruments), Revision 0, December 2012.
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1.

Section 14: Safety Functions Support

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.

Onsite FLEX Diesel Generator

To provide safety function support for the coping strategies following an ELAP event, a 600V AC diesel generator will be staged and connected to power select loads. The loads that will be powered by this onsite FLEX Diesel Generator include a battery charger to each class 1E 125V DC Switchgear, accumulator discharge isolation valves, and RCS FLEX pump (Mode 1-4 or Mode 5-6, as needed). Each battery charger is rated at 600A (Reference 3). The 600 kW, onsite FLEX Diesel Generator will be capable of starting without external equipment and has an installed fuel transfer pump. Other equipment provided for this strategy includes portable switchgear and quick connect power cables for connecting to multiple, separate loads concurrently. Diverse connection points are provided locally at the individual loads.

Main Control Room Accessibility

Continue the Phase 1 strategies to maintain control room accessibility. Employ portable ventilation fans powered by electric generators or gas powered portable fans as necessary. Employ portable battery powered lighting until select MCR lighting will be repowered. Following connection of the onsite FLEX Diesel Generators to power the Class 1E 125V DC Switchgear, the control room emergency light will be reenergized.

Battery and Switchgear Rooms

Following connection of the onsite FLEX Diesel Generator to supply the Class 1E 125V DC battery chargers, the batteries will begin to recharge. During battery charging, hydrogen will be released into the battery rooms. To prevent hydrogen buildup, forced ventilation will be established using portable fans (electrically powered from the onsite FLEX Diesel Generator) if required.

Auxiliary Building 100 ft. Elevation Accessibility

The SG FLEX Pump backup feed connections, as well as the Mode 1-4 and Mode 5-6 RCS FLEX Pumps connections, are in this area. One of the pumps will be operated in Phase 2 depending on the initial plant condition at the time the ELAP/LUHS occurred. Temperature in these areas will remain low enough so as to not impact accessibility or equipment operation given the heat load and building size.

Communication

The communication plan for FNP in response to an ELAP will rely on elements of the NTTF recommendation 9.3 emergency preparedness communication assessment performed in response to the March 12, 2012 NRC letter entitled, "Request for Information Pursuant to Title 10 of the Code of 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." The request for information asked that licensees assess their current communications systems and equipment during a large scale natural event and loss of all alternating current power. On October 31, 2012, FNP committed to actions to

Section 14: Safety Functions Support

address items identified in the assessment (Reference 4).

The specific items for Phase 2 from the referenced 9.3 assessment are 1) the plant public address (PA) system will be repowered using FLEX DGs, and a rapidly deployable communications kit will be utilized to support both satellite and radio communications, if needed, for the ERO, including field monitoring teams. The mobile communications systems will be self-powered via a generator located on board and maintained in a charged condition and independent of onsite or off-site infrastructure. The generator can be refueled using multiple fuel sources which would be available on-site. The mobile communications system does not rely on the availability of either on-site or off-site infrastructure other than satellites, which are assumed to be unaffected by the postulated LSEE.

Refueling Portable Diesel Generators

Diesel fuel is available from the diesel fuel oil storage tanks and will be retrieved and transported using a portable fuel pump (battery powered or manual) and transfer carts. The five underground fuel oil storage tanks are seismically qualified and capable of storing a Technical Specification minimum of 25,000 gallons. This stored quantity of fuel will meet the fuel demand for all of the FLEX equipment well into Phase 3.

References:

1. NEI 12-06, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide”, Rev. 0, August 2012
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1
3. A181004, Ver. 50.0, Functional System Description Electrical Distribution System
4. SNC Letter to NRC on Emergency Preparedness Communication Assessment dated October 31, 2012 as requested by NRC Letter, Request for Information Pursuant to Title 10 of the Code of 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 Daiichi Accident, dated March 12, 2012 (NL-12-2068).

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.*

SNC will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify modifications	*List modifications necessary for phase 2*

Provide a modification; including quick connect points on the 155' elevation and appropriate transfer switches, to allow energizing required plant electrical loads from the onsite FLEX Diesel Generator.

Section 14: Safety Functions Support	
Required loads include the plant battery chargers, accumulator isolation valves, and either the Mode 1-4 RCS FLEX or Mode 5-6 RCS FLEX pump. (NOTE: This same modification is listed in the Core Cooling Phase 2 section.)	
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.*
Same as instruments listed in Safety Functions Support, Phase 1. Phase 2 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment will be protected or scheduled to protect*
Connections for FLEX equipment will be installed seismically rugged and protected or in structures that are seismically rugged or qualified. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Flooding	*List how equipment will be protected or scheduled to protect*
Not applicable per NEI 12-06 as outlined within the first section of this Integrated Plan.	
Severe Storms with High Winds	*List how equipment will be protected or scheduled to protect*
Connections for FLEX equipment will be contained within buildings that are protected or designed for protection from storms and high winds. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.	
Snow, Ice, and Extreme Cold	*List how equipment will be protected or scheduled to protect*

Connections for FLEX equipment will be contained within buildings that are protected or designed for protection from snow, ice, and extreme cold. Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The schedule to construct the structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structures requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.		
High Temperatures	*List how equipment will be protected or scheduled to protect*	
Connections for FLEX equipment will be contained within buildings that are protected or designed for protection from high temperatures. Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized per Reference 1. The schedule to construct structures is still to be determined. The schedule to construct structures is still to be determined. The storage structures construction will be completed for 2 sets of FLEX equipment by the date the first unit will reach the Order EA-12-049 implementation completion due date. The remaining FLEX equipment will be available and protected by the implementation completion date for the second unit. FNP procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to FNP.		
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 will be protected*
Storage location and structure have not yet been decided. After the building design and location are finalized, the deployment routes will be evaluated for external hazards to demonstrate a clear deployment path.	No modifications identified for Phase 2 deployment issues.	Electrical connection points from the onsite FLEX Diesel Generator to Class 1E Battery Chargers and Mode 1-4 or Mode 5-6 RCS FLEX Pump will be designed and installed to withstand the applicable hazards.

Notes:

None

References:

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

Section 14: Safety Functions Support
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1

Section 14: Safety Functions Support		
Safety Functions Support: PWR Portable Equipment Phase 3		
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Offsite FLEX Diesel Generator Large 4160V AC offsite FLEX Diesel Generator will be staged and connected to power the essential electrical distribution systems and/or select loads as needed to support indefinite coping. The loads that will be powered by the offsite FLEX Diesel Generator include RHR pumps, water treatment equipment, and heat exchange circulation pump. Additional plant equipment will be loaded on the offsite FLEX Diesel Generators needed to support plant restoration. Other Support Requirements Other areas of support required in Phase 3 are the same as described in the Phase 2 section of Safety Functions Support.		
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.*	
Details:		
See Phase 2 discussion.		
Identify modifications	*List modifications necessary for phase 3*	
See Phase 2 discussion.		
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.*	
Same as instruments listed in Safety Functions Support, Phase 1. Phase 3 FLEX equipment will have installed local instrumentation needed to operate the equipment. The use of these instruments will be described in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.		
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 will be protected*
Phase 3 equipment will be provided by the Regional	No modifications required for deploying the Phase 3	• Connection points for 4160V AC diesel generators are enclosed within a Seismic Category 1

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Response Center (RRC). Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored. After the building design and location are finalized, the deployment routes, including deployment routes for offsite RRC equipment will be evaluated for external hazards to demonstrate a clear deployment path.	strategy.	structure, which will inherently protect it from local hazards such as vehicle impact. • All other connections and equipment will be portable.

Notes:

None

References:

1. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Rev. 0, August 2012
2. SNCF166-PR-002, Engineering Report, Diverse and Flexible Coping Strategies (FLEX) in Response to NRC Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events for Southern Nuclear Operating Company, Inc., Farley Nuclear Plant, Revision 1

Attachment 1: FLEX Portable Equipment

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) Vehicles					**X**	Vehicles with sufficient rating to tow the pumps and DGs.	In accordance with the EPRI template requirements
Three (3) 600V AC Diesel Generators	**X**			**X**	**X**	Provides power to various small loads (*e.g.*, Diesel Fuel FLEX Pump, Sump Pump) as needed (20-60 kW)	In accordance with the EPRI template requirements
Three (3) 600V AC Diesel Generators	**X**			**X**	**X**	Provides power to 600V FLEX Switchgear (600 kW)	In accordance with the EPRI template requirements
Three (3) Self-powered CST FLEX Pumps	**X**					Provide makeup to CSTs from RMWST and offsite source for all strategies.	Will follow EPRI template requirements
Three (3) Self-powered SG FLEX Pumps	**X**					Provide injection into SGs to remove decay heat from Reactor core. SGs to be de-pressurized to 300 psig prior to utilizing the pump. Pumps must be rated for removal of the decay heat at one hour after reactor shutdown (300 gpm) with TDH high enough to overcome line losses and SG pressure.	Will follow EPRI template requirements
Two (2) Self-powered SFP FLEX Pumps (200% capacity)			**X**			Provide minimum flow for spray of both SFPs (500 gal/min total).	Will follow EPRI template requirements
Three (3) Electric motor-driven Mode 1-4 RCS FLEX pumps	**X**					Provides borated water injection (from the BAST/BAT or RWST) to RCS during modes with SGs available for decay heat removal; 30 gpm at 400 psi minimum to 540 psi maximum for RPV injection	Will follow EPRI template requirements. Stored in the Auxiliary Building on the 100′ Elevation.
Two (2) Electric motor-driven Mode 5-6 RCS FLEX pumps .	**X**					Provides borated water injection from the RWST at 100 gpm at 100 psi for RPV injection during modes 5-6 for core cooling.	Will follow EPRI template requirements. Stored in the Auxiliary Building on the 100′ Elevation
Two (2) Electric motor-driven Diesel Fuel FLEX pumps	**X**		**X**	**X**	**X**	Supplies makeup diesel fuel to portable transfer carts (minimum suction lift required to access bottom of Diesel Fuel Storage Tanks from grade level).	Will follow EPRI template requirements. Support equipment

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
Flatbed Trailers	**X**	**X**	**X**			Flatbed trailer provides a Means to store and transport hoses, strainers, cables, and miscellaneous equipment.	
Three (3) Trailers with Fuel Tank and Portable Fuel Containers	**X**	**X**	**X**		**X**	Provides diesel fuel to FLEX equipment.	
Three (3) sets of Monitor Spray Nozzles for SFP Spray and required hoses			**X**			Provides 250 gpm of spray water for each unit	Will follow EPRI template requirements
Hoses, cables, fittings, and connectors	**X**	**X**	**X**		**X**		Will follow EPRI template requirements
Two (2) Rapidly Deployable Communications Kit	**X**	**X**	**X**	**X**	**X**	Does not rely on the availability of either on-site or off-site infrastructure other than satellites	Will use manufacturers recommended practices as basis

Notes: This table provides N +1 (Three) sets of FLEX equipment as required to be protected to comply with NEI 12-06. The actual quantity of equipment that will be purchased and stored in site structures will be determined based using the guidance in NEI 12-06 once the decision on storage structures is determined.

PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Two (2) 4160VAC Diesel Generators.	**X**	**X**	**X**	**X**	**X**	4160V, approximately 3MW	Capacity to re-power essential electrical distribution, RHR/SFP pumps, etc.
Two (2) air-cooled heat exchangers.	**X**	**X**	**X**			$60x10^6$ BTU Hours, 8000 gpm	Portable heat exchange will provide heat removal from RHR heat exchanger, RHR pump cooler, containment fan coolers, and SFP coolers.
Two (2) pumps to circulate cooled water from RRC heat exchangers.	**X**	**X**	**X**			8000 gpm	Pump provides flow through the portable heat exchanger and the RHR heat exchanger, RHR pump cooler, containment fan coolers, and SFP coolers.
Two (2) Boron mixing systems (skids)	**X**					N/A	Provide makeup on depletion of RWST
Two (2) makeup water treatment facility	**X**		**X**			To provide 200 gpm of purified water	Provides high quality makeup water source
Diesel Fuel	**X**	**X**	**X**	**X**			Supply as required
Cables for connecting portable generators	**X**	**X**	**X**	**X**	**X**		Supply as required
Portable ventilation fans				**X**	**X**		Supply as required
Radiation Protection Equipment					**X**		Survey instruments, dosimetry, off-site monitoring and sampling
Pumps to provide river water	**X**		**X**			500 gpm	Make-up to on-site water systems

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment Survey instruments Dosimetry Off-site monitoring/sampling	
Commodities Food Potable water	
Fuel Requirements Diesel Fuel	
Heavy Equipment Transportation equipment Debris clearing equipment	
Portable Lighting	
Portable Toilets	

Attachment 1A: Sequence of Events Timeline

Action Item	Elapsed Time	Action	ELAP New Time Constraint Y/N [7]	Remarks / Applicability
	0	Event Starts	N	Plant @100% power
1	60 sec	TDAFW pumps start	N	RO subsequently verifies initiation of TDAFW and that SGs level is increasing.
2	~5 min	Attempt to establish DG emergency power from EPB and local diesel start	N	RO attempts to start EDG from MCR and dispatches SO to start locally.
3	~5 min	Evaluate off site power with offsite Power Coordination Center	N	Shift Manager determines availability of offsite power
4	30 min	Attempts to start EDGs have been unsuccessful. Enter ELAP Procedure	Y	Time critical at a time greater than 40 minutes. Entry into ELAP provides guidance to operators to perform ELAP actions.
5	35 min	Control room emergency lighting	Y	Time critical at a time greater than 45 minutes. Stage portable battery powered lighting for use in MCR following extended load shed.
6	50 min.	DC extended load shed complete	Y	Time critical at a time greater than 1 hour. Action to minimize battery load to extend operation of the DC and vital AC buses.
7	2 hrs.	TDAFWP manual flow to intact SGs	Y	Time critical at a time greater than 2 hours. RO dispatches SO to take manual control of TDAFW pump following TDAFW UPS depletion.
8	8 hrs.	Stage and connect onsite FLEX DG to DC bus battery chargers and RCS FLEX pump	Y	Time critical at a time greater than 8.5 hours.Onsite FLEX diesel generator will be utilized to power the battery chargers and to recharge the batteries.
9	10 hrs.	Stage and connect portable SG FLEX pump in the event a TDAFW pump fails.	N	FLEX pumps will be staged beginning at approximately 8-10 hour time frame.

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

Action Item	Elapsed Time	Action	ELAP New Time Constraint Y/N [7]	Remarks / Applicability
10	10 hrs.	Initiate depressurization of the steam generators to achieve the RCS cooldown and depressurization.	Y	Time critical at a time greater than 15 hours. Depressurizing the SG enables the ability to borate the RCS prior to net xenon decay (i.e., within 24 hours) and also the SG FLEX pump if the TDAFW pump fails.
11	12 hrs.	Begin makeup to the CST from the RMWST using the CST FLEX pump	Y	Time critical at a time greater than 12.5 hours. Operator starts the transfer of water from the RMWST to the CST before the initial CST inventory will be exhausted.
12	14 hrs.	Initiate boration of the RCS to ensure maintenance of the subcritical reactor state.	Y	Time critical at a time greater than 19 hours. Operator starts the transfer of water from the BAST/BATs to the RCS to ensure adequate boration and sub-criticality.
13	>23 hrs.	Begin makeup to SFP as necessary to maintain adequate level in the SFP. Venting and staging hoses to the spent fuel pool area will be completed prior to this time. Water level remains above the top of the active fuel for greater the 53 hours even assuming worst case design core offload conditions.	N	Boil-off rate is slow with a large volume of water in the SFP. SFP level remains above the top of the active fuel for greater the 53 hours even assuming worst case design core offload conditions. Action in the SFP area will be completed before the SFP area becoming uninhabitable.
14	36 hrs.	Begin makeup to the CST from the service water pond (UHS) through portable water treatment equipment (filtration/demineralizer plant from the RRC)	Y	Time critical at a time greater than 36.5 hours. Operator starts the transfer of water from the service water pond (UHS) through portable water treatment equipment (filtration/ demineralizer plant) before the initial CST/RMWST inventory will be exhausted.
15	72 hrs.	Transition from Phase 2 to Phase 3 for Core Cooling function by placing RRC pumps and heat exchanger in service to cool plant down to cold shutdown. Requires staging and operation of 4160 VAC RRC Portable DGs	N	If RRC pumps and heat exchanger are not available or some other reason prevents going to cold shutdown then the plant can be maintained in a stable condition with FLEX pumps in service for injection or makeup to CST.

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
	None				

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}*
Oct. 2012	Submit 60 Day Status Report	Complete
Feb. 2013	Submit Overall Integrated Implementation Plan	Complete
Aug. 2013	Submit 6 Month Status Report	
Sep. 2013	Initiate Phase 2 Equipment Procurement	
Nov 2013	Develop Strategies (Playbook) with RRC	
Dec. 2013	Develop Operational Procedure Changes	
Jan 2014	Develop Modifications	
Feb. 2014	Submit 6 Month Status Report	
Mar. 2014	Develop Training Material	
Aug. 2014	Submit 6 Month Status Report	
Sep 2014	Issue FSGs	
Nov. 2014	Implement Training	
Nov. 2014	Unit 2 Implementation Outage *	
Feb. 2015	Submit 6 Month Status Report	
Apr. 2015	Unit 1 Implementation Outage *	
Spring 2015	Submit Completion Report	

*(Full compliance after second listed refueling outage)

Attachment 3: Conceptual Sketches

(Conceptual sketches, as necessary to indicate equipment which will be installed or equipment hookups necessary for the strategies.)

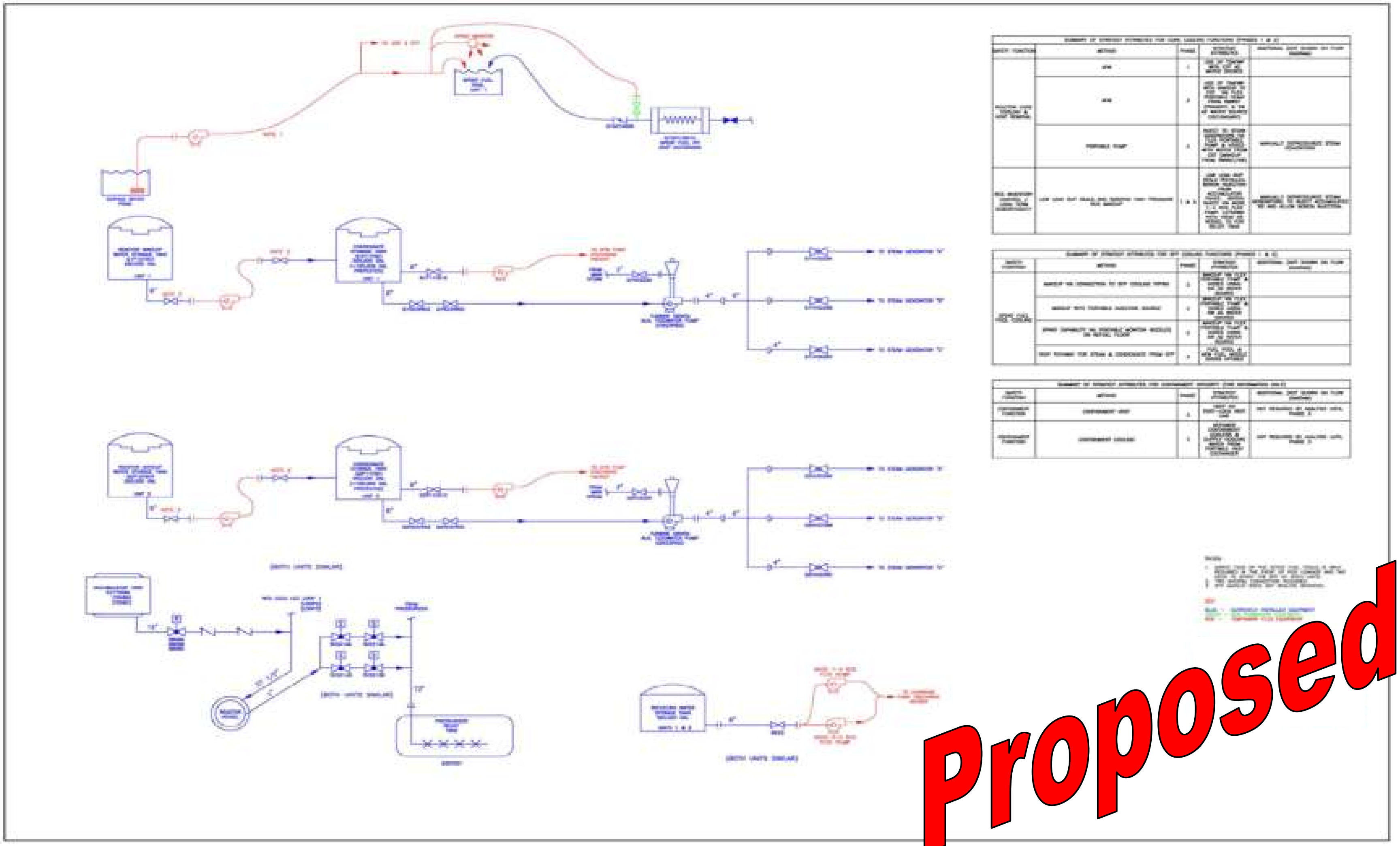


Figure 1 – Flow Diagram for Phase 2 FLEX Strategies

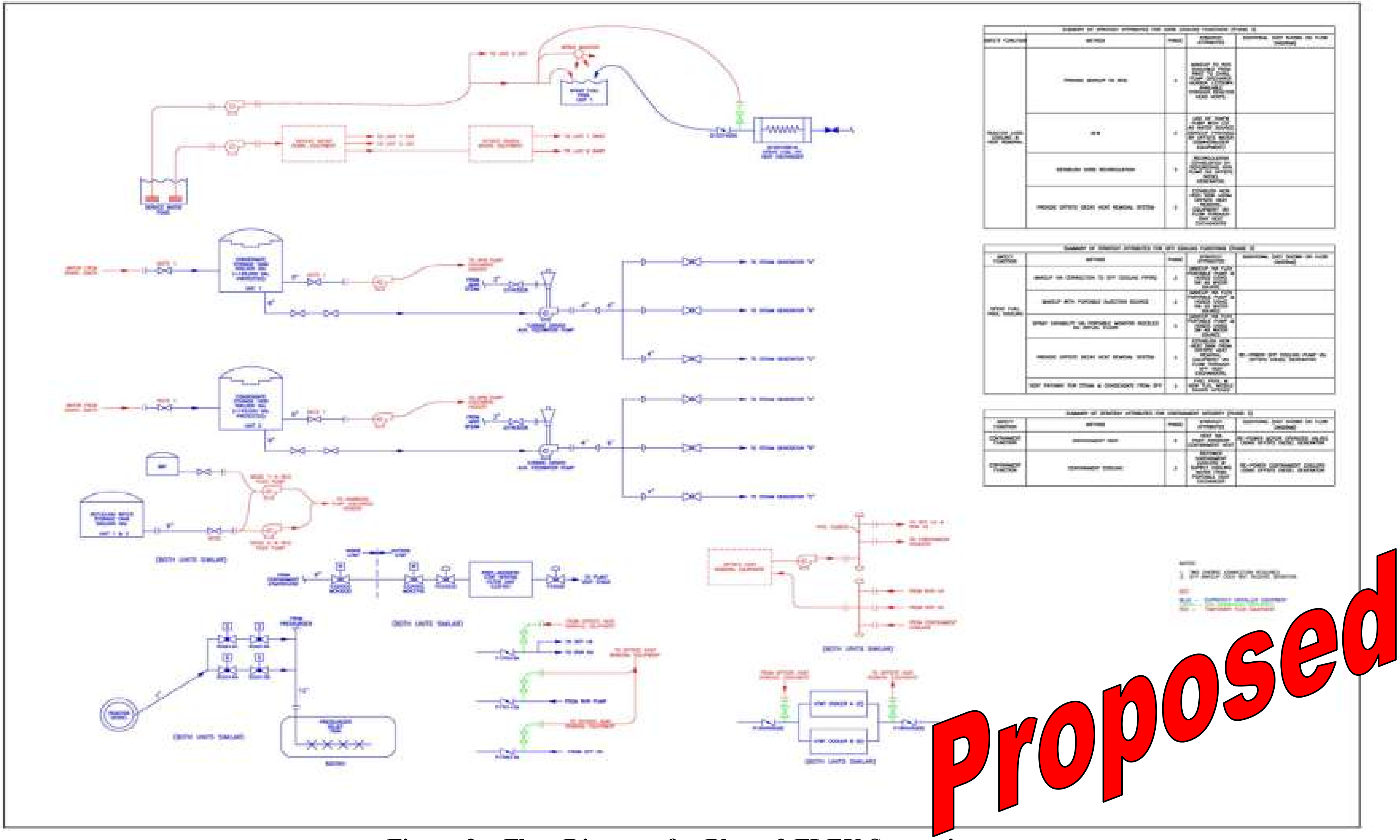
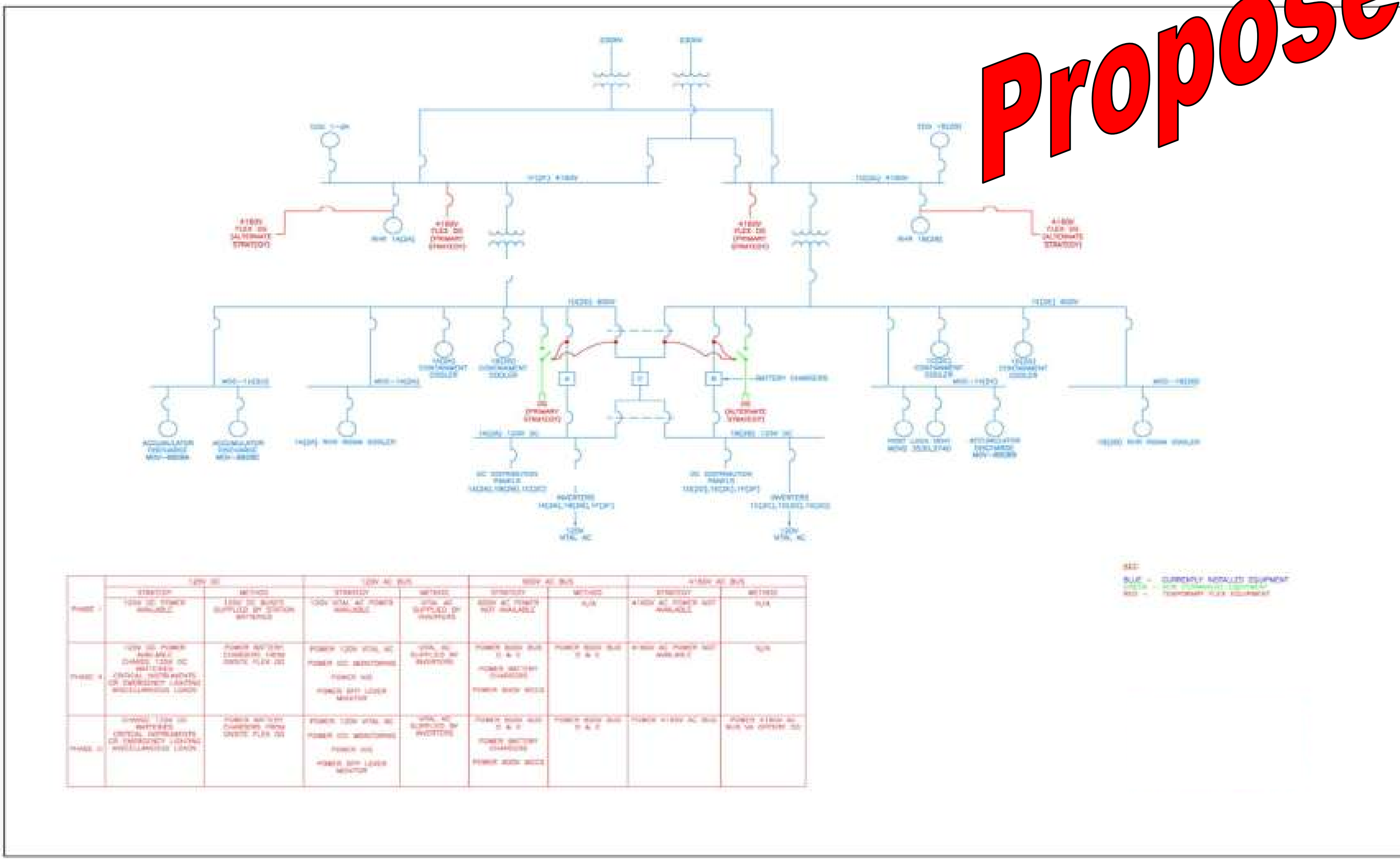


Figure 2 – Flow Diagram for Phase 3 FLEX Strategies

Proposed



	125V DC		120V AC BUS		600V AC BUS		4160V AC BUS	
	STRATEGY	METHOD	STRATEGY	METHOD	STRATEGY	METHOD	STRATEGY	METHOD
PHASE 1	125V DC POWER AVAILABLE	125V DC BUSES SUPPLIED BY STATION BATTERIES	120V VITAL AC POWER AVAILABLE	VITAL AC SUPPLIED BY INVERTERS	600V AC POWER NOT AVAILABLE	N/A	4160V AC POWER NOT AVAILABLE	N/A
PHASE 2	125V DC POWER AVAILABLE CHARGE 125V DC BATTERIES CRITICAL INSTRUMENTS OR EMERGENCY LIGHTING MISCELLANEOUS LOADS	POWER BATTERY CHARGERS FROM ONSITE FLEX DG	POWER 120V VITAL AC POWER DC MONITORING POWER [illegible] POWER SFP LEVEL MONITOR	VITAL AC SUPPLIED BY INVERTERS	POWER 600V BUS D & E POWER BATTERY CHARGERS POWER 600V MCCS	POWER 600V BUS D & E	4160V AC POWER NOT AVAILABLE	N/A
PHASE 3	CHARGE 125V DC BATTERIES CRITICAL INSTRUMENTS OR EMERGENCY LIGHTING MISCELLANEOUS LOADS	POWER BATTERY CHARGERS FROM ONSITE FLEX DG	POWER 120V VITAL AC POWER DC MONITORING POWER [illegible] POWER SFP LEVEL MONITOR	VITAL AC SUPPLIED BY INVERTERS	POWER 600V BUS D & E POWER BATTERY CHARGERS POWER 600V MCCS	POWER 600V BUS D & E	POWER 4160V AC BUS	POWER 4160V AC BUS VIA OFFSITE DG

Figure 3 – Electrical Diagram for FLEX Strategies