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10 CFR 50.4

February 28, 2013
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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325, 50-324
Overall Integrated Plan in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number EA-12-049, *Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, dated March 12, 2012, ADAMS Accession Number ML12054A735
2. NRC Interim Staff Guidance JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, Revision 0, dated August 29, 2012, ADAMS Accession Number ML12229A174
3. Letter from Michael J. Annacone (CP&L) to U.S. Nuclear Regulatory Commission, *Carolina Power & Light Company and Florida Power Corporation'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 29, 2012, ADAMS Accession Number ML12307A021

On March 12, 2012, the U.S. Nuclear Regulatory Commission issued Order EA-12-049 (Reference 1) to Carolina Power & Light Company (CP&L). Reference 1 was immediately effective and directs CP&L 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, including a description of how compliance with the requirements described in Attachment 2 of Reference 1 will be achieved, by February 28, 2013, and subsequent submission of interim status reports at six-month intervals following submittal of the overall integrated plan. In accordance with Section IV, Condition C.1, of Reference 1, CP&L hereby submits to the NRC for its review the enclosed overall integrated plan for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2, including a description of how compliance with the requirements described in Attachment 2 of Reference 1 will be achieved.

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The enclosure contains the current design information, as of the writing of this letter, much of which is still preliminary, pending completion of on-going evaluations and analyses. As further design details and associated procedure guidance are finalized, supplemental information will be communicated to the NRC in the six-month status reports required by Reference 1.

This document contains no regulatory commitments.

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 457-2487.

I declare, under penalty of perjury, that the foregoing is true and correct. Executed on February 28, 2013.

Sincerely,

Michael J. Annacone

Enclosure: Overall Integrated Plan for the Brunswick Steam Electric Plant (BSEP) cc (with enclosure):

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# Overall Integrated Plan for the Brunswick Steam Electric Plant (BSEP)

# General Integrated Plan Elements (PWR & BWR)

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| **Determine Applicable Extreme External Hazard**<br>**Ref: NEI 12-06 Section 5.0 -9.0**<br>**JLD-ISG-2012-01 Section 1.0** | *Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps.*<br>*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 Brunswick Steam Electric Plant (BSEP) are seismic events; external flooding; storms with high winds, including hurricanes and tornadoes; ice; and extreme heat. The external hazards are detailed below.

Seismic Hazard Assessment:
Per the FLEX guidance, seismic impact must be considered for all nuclear plant sites. Therefore, the BSEP site screens in for seismic hazards. As a result, the systems, structures, or components credited in the BSEP FLEX strategy (including portable and pre-staged FLEX equipment) will be assessed based on the current BSEP seismic licensing basis to ensure that the equipment, systems, structures, or components remain accessible and available after a seismic event and that the FLEX equipment does not become a target or source of a seismic interaction from other systems, structures or components.

The Design Basis Earthquake (DBE) at BSEP has a horizontal acceleration value of 0.16 g [Updated Final Safety Analysis Report (UFSAR) Section 2.5.2.5]. The Operating Basis Earthquake (OBE) at BSEP has a horizontal ground acceleration value of 0.08 g [UFSAR Section 2.5.2.6].

Analysis has shown that soil liquefaction will not occur at the site under dynamic loadings of the DBE. [UFSAR Section 2.5.4.8] Therefore, soil liquefaction is screened out for the BSEP site.

The protection of and deployment of FLEX equipment, procedural interfaces, and considerations in utilizing off-site resources during/after seismic events are being considered.

External Flood Hazard Assessment:
Information for this section is from UFSAR Section 2.0.

At BSEP, the Probable Maximum Hurricane (PMH) defines the Probable Maximum Flood (PMF). The most severe flood conditions are associated with a PMH coinciding with peak local astronomical tides.

The open coast stillwater surge is 22 feet Mean Sea Level (MSL). The surge stillwater level at the BSEP site is 22.0 feet MSL.

The Cape Fear River transmits tidal flows very efficiently and, therefore, is expected to have a peak storm elevation of 23.3 feet MSL on shore. This peak tide will not reach the site, but will intercept natural ground about one fourth of a mile east of the site near River Road. Thus, no tide or wave action is expected to reach the plant from an overland direction.

In the intake canal, the still water level is expected to reach 22.0 feet MSL. The nominal plant grade of 20 feet MSL results in two feet of water depth surrounding the plant during maximum surge conditions. Therefore, BSEP is not a dry site because site grade is below the maximum probable flood level and screens in for external flooding hazards. Safety-related structures are waterproofed to elevation 22 feet MSL.

The wave action on structures on the ground will depend on the overland water depth caused by flooding. This depth being 2.0 feet maximum, the highest wave that can be sustained will be 1.6 feet high. Larger waves over 1.6 feet coming from any overland direction will break when they reach the 2-foot depth overland. Wave run-up on a vertical wall associated with 1.6-foot waves is about 3.6 feet. Thus, the maximum instantaneous water elevation on any of these buildings is 25.6 feet MSL.

Concerning the wave action on the Service Water Intake Structure, waves generated or propagated along the intake canal were conservatively estimated and reported as 3.0 feet high with a period of four seconds. The run-up due to these waves at the Intake Structure resulted in the maximum instantaneous water level of 28.3 feet MSL.

The protection of and deployment of FLEX equipment, procedural interfaces, and considerations in utilizing off-site resources during/after flooding are being considered.

High Wind Hazard Assessment:
According to Figures 7-1 and 7-2 from Nuclear Energy Institute (NEI) 12-06 [Ref. 1], it was determined that BSEP has the potential to experience damaging winds caused by a hurricane up to 210 mph. Figure 7-2 indicates that BSEP, located at 33°57'30"N 78°00'30"W [UFSAR Section 2.1.1.1], is within Tornado Region 1, where the recommended maximum tornado wind speed design is 200 mph. At BSEP, using NEI 12-06 guidance [Ref. 1], hurricane wind speeds exceed those of tornadoes. High wind hazards are applicable to the BSEP site. Therefore, the BSEP site screens in to high wind hazards (hurricanes and tornadoes).

As a result, the systems, structures, or components credited in the BSEP FLEX strategy (including portable and pre-staged FLEX equipment) will be assessed based on the current BSEP licensing basis for high wind hazards to ensure that the equipment, systems, structures, or components remain accessible and available after a high wind event including interaction from other systems, structures or components during a high wind event. The protection of and deployment of FLEX equipment, procedural interfaces, and considerations in utilizing off-site resources during/after severe storms with high winds are being considered.

Snow, Ice and Extreme Cold Assessment:
Per NEI 12-06, BSEP is below the 35th parallel; therefore, the FLEX strategies are not required to consider the impedances caused by extreme snowfall with snow removal equipment. Because the same basic trend applies to extreme low temperatures, per NEI 12-06, BSEP FLEX strategies are not required to address extreme low temperatures.

BSEP is a Level 4 region as defined by Figure 8-2 of NEI 12-06. Since the BSEP site is not in a Level 1 or Level 2 region, FLEX strategies must consider the impedances caused by ice storms.

Therefore, the BSEP site screens in for impact of ice storms.

The protection of and deployment of FLEX equipment, procedural interfaces, and considerations in utilizing off-site resources during/after conditions of ice are being considered.

Extreme High Temperature Hazard Assessment:
NEI 12-06, Section 9.2 states that virtually every state in the lower 48 contiguous United States has experienced temperatures in excess of 110°F and many in excess of 120°F. Per NEI FLEX Implementation Guide 12-06, "all sites will address high temperatures." Therefore, the BSEP site screens in for extreme high temperatures.

The protection of and deployment of FLEX equipment, procedural interfaces, and considerations in utilizing off-site resources during/after conditions of high temperatures are being considered.

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| **Key Site assumptions to implement NEI 12-06 strategies.**<br>**Ref: NEI 12-06 Section 3.2.1** | *Provide key assumptions associated with implementation of FLEX Strategies:*<br>• *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.*<br>• *Exceptions for the site security plan or other (license/site specific) requirements of 10 CFR may be required.*<br>• *Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours.*<br>• *Certain Technical Specifications cannot be complied with during FLEX implementation.* |

The key assumptions associated with implementation of FLEX Strategies are provided below:

1. The general criteria and baseline assumptions, specified in NEI 12-06 Section 3.2.1, are applicable in establishing the baseline coping capability for BSEP.
2. 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 spent fuel pool (SFP) cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications and/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p).

The following conditions exist:

1. All installed AC power supplies (emergency on-site and SBO Alternate AC power sources as defined by 10 CFR 50.2) will be considered not available and not imminently recoverable.
2. Direct Current (DC) power supplies are available.
3. AC and DC distribution is available.
4. Any future Station Blackout (SBO) or Extended Loss of Alternating Current Power (ELAP) Rule is assumed to be consistent with Order EA-12-049 [Ref. 2] and JLD-ISG-2012-01 [Ref. 5]. Different or additional requirements in the Rule may necessitate a change in the plans made in the BSEP response to the Order [Ref. 2].
5. Plant initial response is the same as SBO.
6. Entry to ELAP will be within 1 hour.

7. Modular Accident Analysis Program (MAAP) analysis for decay heat is used to establish operator time and action.
8. No single failure of a system, structure, and component (SSC) is assumed.
9. SSCs will be considered seismically robust if seismic requirements are imposed by licensing requirements.
10. Where non-safety, non-seismically designed, permanently installed equipment is used for FLEX strategies, SSCs will be considered seismically robust if:
    - Seismic Qualification Utility Group (SQUG) methods are applied per the existing plant licensing basis.
    - Testing, analysis, or experienced-based methods are applied for the equipment class at design basis seismic levels.
    - Methodologies in EPRI 1019199, *Experience Based Seismic Verification Guidelines for Piping and Tubing Systems*, can be successfully applied relative to the Safe Shutdown Earthquake (SSE).
    - Other industry recognized codes such as AWWA D100 are applied to demonstrate functionality at SSE level ground motion.
    - High Confidence of a Low Probability of Failure (HCLPF) capacities are determined (e.g., EPRI NP-6041, Revision 1) conservative compared to the SSE.
11. SSCs will be considered robust relative to tornado or hurricane winds if generally accepted standards and computer codes demonstrate that the SSC can perform its function using the maximum wind speeds outlined in NEI 12-06.
12. The FLEX connections will either be qualified or in diverse locations.
13. Implementation strategies are assessed for hazards impact.
14. Personnel access to, and qualification of, equipment that forms a part of the FLEX strategy assumes no core damage.
15. Maximum environmental room temperatures for habitability or equipment availability is based on NUMARC 87-00 guidance if other design basis information or industry guidance is not available.
16. Although operation of portable equipment will not begin until Phase 2, pre-staging and alignment of portable equipment in Phase 1 using available on-site personnel will be credited.
17. Per NEI 12-06 Section 12.1, on-site resources will be used to cope with the first two Phases of the event and for a minimum of the first 24 hours of the event. Emergency Response Organization (ERO) personnel are assumed to begin arriving at 6 hours and the site ERO will be fully staffed at 24 hours after the event.
18. Phase 3 resources (personnel and equipment) are assumed to start arriving within 24 hours in accordance with the Regional Resource Center (RRC) playbook. All resources from the RRC are assumed to be available within 72 hours.
19. 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 program and addressed.
20. The 10 CFR 50.54(f) seismic and flood re-evaluations do not result in changes to the current design basis. Additionally, it is assumed that the seismic re-evaluation does not

adversely impact the equipment that forms a part of the BSEP FLEX strategy. Any changes to the seismic or flood design basis may require a change to the plans in the BSEP response to the Order [Ref. 2].

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| **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.**<br>**Ref: JLD-ISG-2012-01**<br>**NEI 12-06 13.1** | *Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* |

BSEP 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 six month update following identification.

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| **Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint.**<br>**Ref: NEI 12-06 Section 3.2.1.7**<br>**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).*<br>*Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A*<br>*See attached sequence of events timeline (Attachment 1A).*<br>*Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B).* |

Sequence of Events Timeline Constraints

1. Within one hour fifteen minutes after a Beyond-Design-Basis External Event (BDBEE) occurs and the reactor scrams, deep load shedding must be completed. Deep load shedding is only required if both severe accident management alternative (SAMA) diesel generators fail to start.
2. Within five hours of the BDBEE, the SAMA diesel generators must be started with connections to both Unit 1 and Unit 2 Division II battery chargers established.
3. If the Condensate Storage Tank (CST) is lost during the BDBEE, Reactor Core Isolation Cooling (RCIC) System must be aligned to the clean water tank. This must occur when the Suppression Pool reaches 200°F, which occurs approximately 5.4 hours after the BDBEE.
4. Approximately 9 hours after the BDBEE, the SAMA diesel generators will be aligned to 480 volt AC (VAC) to provide power to 24/48 volt DC (VDC) battery chargers, motor operated valves (MOV), AC instruments, battery room fans, etc. This must be completed within 24 hours of the BDBEE to support the 24/48 VDC Hardened Containment Vent System (HCVS) batteries.
5. Approximately 19.5 hours after the BDBEE, containment will be vented via the HCVS, prior

to exceeding Primary Containment Pressure Limit (PCPL-A). This must be completed within approximately 19.5 hours after the BDBEE.

6. The FLEX pump connection will be established to SFP makeup approximately 24 hours after the BDBEE. This must be completed 56.8 hours after the BDBEE.
7. Transition to Phase 3 will begin 24 hours after the BDBEE. Transition to Phase 3 is expected to be completed approximately 72 hours after the BDBEE.

Estimated deployment, connection, and action times were produced via table top exercise and have shown that the time-sensitive activities will be performed in sufficient time. A formal validation of timelines will be performed once the procedural guidance is developed and related staffing study is completed (Open Item 1). See the attached sequence of events timeline (Attachment 1A).

Technical Basis Support Information

1. The sequence of events timeline was based on a coping time analysis using MAAP [Ref. 4]. This analysis determined the key parametric values versus time.
2. On behalf of the Boiling Water Reactor Owners Group (BWROG), GE-Hitachi (GEH) developed a document (NEDC-33771P, Revision 1 [Ref. 3]) to supplement the guidance in NEI 12-06 by providing additional BWR-specific information regarding the individual plant response to the ELAP and Loss of Normal Access to the Ultimate Heat Sink (LUHS) 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. In the document, GEH utilized the NRC accepted SUPERHEX (SHEX) computer code methodology for BWRs' long term containment analysis for the ELAP analysis. As part of this document, a generic BWR 4/Mark I containment NSSS evaluation was performed. The BWR 4/Mark I containment analysis is applicable to the BSEP (a BWR 4 Mark I plant) coping strategy because it supplements the guidance in NEI 12-06 by providing BWR-specific information regarding plant response for core cooling, containment integrity, and spent fuel pool cooling. The guidance provided in the document was utilized, as appropriate, to develop coping strategies and for prediction of the plant's response. See Attachment 1B for deviations from the GEH document.

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| **Identify how strategies will be deployed in all modes.**<br>**Ref: NEI 12-06 Section 13.1.6** | *Describe how the strategies will be deployed in all modes.* |

FLEX deployment vehicles and debris removal equipment will be utilized to transport FLEX equipment to the staging areas. Specific hose routes have been identified for primary and alternate connection points (see Attachment 3 Sketches 1 through 3). Sketch 1 identifies hose routing for primary Reactor Pressure Vessel (RPV) and primary SFP injection. Sketch 2 identifies hose routes for alternate RPV makeup. Sketch 3 identifies hose routes for alternate SFP makeup. Sketches 1 through 3 also identify the FLEX pump staging location.

The identified paths and deployment areas will be accessible during all modes of operation. This deployment strategy will be included within an administrative program in order to keep pathways clear or actions to clear the pathways.

<table>
<tr>
<td>Provide a milestone schedule. This schedule should include:<br>• Modifications timeline<br>  o Phase 1 Modifications<br>  o Phase 2 Modifications<br>  o Phase 3 Modifications<br>• Procedure guidance development complete<br>  o Strategies<br>  o Maintenance<br>• Storage plan (reasonable protection)<br>• Staffing analysis completion<br>• FLEX equipment acquisition timeline<br>• Training completion for the strategies<br>• Regional Response Centers operational<br>Ref: NEI 12-06 Section 13.1</td>
<td>The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.<br>See attached milestone schedule Attachment 2.</td>
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<tr>
<td colspan="2">See the attached milestone schedule in Attachment 2.</td>
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| **Identify how the programmatic controls will be met.**<br>**Ref: NEI 12-06 Section 11**<br>**JLD-ISG-2012-01 Section 6.0** | *Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section.*<br>*See section 6.0 of JLD-ISG-2012-01.* |
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BSEP will implement programmatic controls as defined below (Open Item 2). Procedures and guidelines will be reviewed and revised and/or generated as required to address additional programmatic controls as a result of FLEX requirements.

Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control in accordance with NEI 12-06 Section 11.1. Installed structures, systems and components pursuant to 10 CFR 50.63(a) will continue to meet augmented guidelines of RG 1.155, *Station Blackout*. The unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy will be managed using plant equipment control guidelines developed in accordance with NEI 12-06 Section 11.5 (Open Item 3).

Programs and processes will be established to assure personnel proficiency in the mitigation of beyond-design-basis events is developed and maintained in accordance with NEI 12-06 Section 11.6 (Open Item 4).

The FLEX strategies and basis will be maintained in overall FLEX basis documents (Open Item 5). Existing plant configuration control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with NEI 12-06 Section 11.8 (Open Item 6).

| **Describe training plan** | *List training plans for affected organizations or describe the plan for training development.* |
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Training will be initiated through the Systematic Approach to Training (SAT) process. Training will be developed and provided to all involved plant personnel based on any procedural changes or new procedures developed to address and identify FLEX activities. Applicable training will be completed prior to the implementation of FLEX (Open Item 7).

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| **Describe Regional Response Center plan** | *Discussion in this section may include the following information and will be further developed as the Regional Response Center development is completed.*<br>▪ *Site-specific RRC plan*<br>▪ *Identification of the primary and secondary RRC sites*<br>▪ *Identification of any alternate equipment sites (i.e. another nearby site with compatible equipment that can be deployed)*<br>▪ *Describe how delivery to the site is acceptable*<br>▪ *Describe how all requirements in NEI 12-06 are identified.* |

The industry will establish two (2) Regional Response Centers (RRC) to support utilities during beyond design basis events. Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local Assembly Area, established by the Strategic Alliance of FLEX Emergency Response (SAFER) team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request. A contract has been signed between the site and the Pooled Equipment Inventory Company to provide Phase 3 services and equipment.

**Notes:** None

| Maintain Core Cooling | |
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| **Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06:**<br>• **RCIC/HPCI/IC**<br>• **Depressurize RPV for injection with portable injection source**<br>• **Sustained water source** | |
| **BWR Installed Equipment Phase 1:** | |
| **Level Control**<br>During an ELAP, with only DC power available, the main method of RPV level control is RCIC, with High Pressure Coolant Injection System (HPCI) as a backup. RCIC takes suction from either the CST or the Suppression Pool and pumps water into the RPV. The CST is the preferred source of feed to the RPV for makeup, since it is not subject to heat-up like the Suppression Pool. It also is the normally aligned suction source to RCIC and HPCI. However, if the CST is unavailable, RCIC takes suction from the Suppression Pool. [Ref. 6 and 13]<br>As the Suppression Pool increases in temperature, RCIC will approach operating limits. In order to maintain RCIC availability, a clean water tank with availability to supply RCIC/HPCI will then provide a means of level control.<br>**Pressure Control**<br>Safety Relief Valves (SRVs) provide RPV pressure control during an ELAP. The steam from the RPV drives the HPCI/RCIC turbines, removing heat that would otherwise go directly to the Suppression Pool via the SRVs. The steam exhaust is then sent to the Suppression Pool to be quenched. | |
| **Details:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| • Perform an analysis to establish RCIC availability following applicable BDBEEs.<br>• BSEP will utilize the industry developed guidance from the BWROG, RCIC Pump and Turbine Durability Evaluation – Pinch Point Study [Ref. 7].<br>• BSEP 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. | |

[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.

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| **Identify modifications** | *List modifications.* |

There are no modifications necessary to support the coping strategies during Phase 1.

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

The instruments listed in the table below are available with loss of all AC power and uninterruptible power supply (UPS) de-energized, per Attachment 3 of the SBO procedure [Ref. 8].

As described in the Safety Functions Support section, these instruments are available during Phase 1 on station batteries. During Phase 2, SAMA diesel generators will be tied into motor control centers (MCCs) to power the battery chargers, prior to battery depletion. During Phase 3, 4160 VAC power will be provided and this instrumentation will remain available. Therefore, through all three phases of the event, the instruments in the table below are available.

| Instrument | Parameter |
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| C32-LI-R606A (N004A)<br>C32-LI-R606B (N004B)<br>C32-LI-R606C (N004C)<br>B21-LI-R604BX (N026B)<br>B21-LI-610 (N036)<br>B21-LI-3331 (3331)<br>B21-LI-5977 (5977) | RPV Level |
| B21-PI-R605A<br>B21-PI-R605B | RPV Pressure |
| CAC-PI-3341 | Drywell Pressure |
| CAC-LI-3342 | Suppression Pool Level |
| CAC-TR-778 PT 6<br>CAC-TR-778 PT 7 | Suppression Pool Temperature |
| CAC-TR-778 PT 1,3,4 | Drywell Temperature |
| CAC-TR-778 PT 5 | Suppression Chamber Air Temperature |

**Notes:** None

| Maintain Core Cooling | |
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| **BWR Portable Equipment Phase 2:** | |
| **Level Control**<br>The RCIC system provides the primary means of level control during Phase 2. Operation of RCIC in Phase 2 requires adequate steam in the RPV for motive force and an available suction source within expected RCIC operating temperature limits. DC power enhances operating capabilities of RCIC, but is not required.<br>As the Suppression Pool increases in temperature, RCIC will approach operating limits. As described in Phase 1, in order to maintain RCIC availability, a clean water tank with availability to supply RCIC will then provide a means of level control. If RCIC is unavailable, a portable FLEX pump will be used to provide makeup to the RPV from the CST (if available) or the clean water tank.<br>After depressurizing the RPV, the primary means of providing level control is through portable FLEX pump.<br>**Pressure Control**<br>There are no changes in the methods for pressure control from Phase 1 to Phase 2. | |
| **Details:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| BSEP 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. | |
| **Identify modifications** | *List modifications.* |

| Maintain Core Cooling | |
|---|---|
| **BWR Portable Equipment Phase 2:** | |
| • Build clean water tank with availability to supply RCIC/HPCI with water of acceptable quality for RCIC/HPCI injection into RPV. See Attachment 3, Sketch 4 for more details.<br>• Install quick-disconnect connection point downstream of the CST isolation valve to allow for a gravity drain between the clean water tank and the RCIC/HPCI suction supply piping. See Attachment 3, Sketch 4 for more details.<br>• Install cross connect between the Unit 1 and Unit 2 RCIC/HPCI suction supply lines to the Unit 2 RCIC/HPCI suction supply piping to be aligned to the Unit 1 RCIC/HPCI suction supply piping. See Attachment 3, Sketch 4 for more details.<br>• Build a single qualified structure capable of withstanding external events for storage of FLEX equipment. See Attachment 3, Sketch 5 for more details.<br>• Install quick-disconnect connection point on Auxiliary Steam Supply line inside the Turbine Building Heater Drain Pump Rooms and an Auxiliary Steam Supply line to RCIC piping interconnection for injection into RPV by FLEX pump. See Attachment 3, Sketch 4 for more details.<br>• Design and pre-stage modified flange adapter for connection of FLEX pump discharge hose to Integrated Leak Rate Test (ILRT) piping for RPV makeup through RHR B Loop water injection. See Attachment 3, Sketch 4 for more details. | |
| **Key Reactor Parameters** | *List instrumentation credited or recovered for this coping evaluation.* |
| See parameters in Phase 1. | |
| | |

| Storage / Protection of Equipment :<br>Describe storage / protection plan or schedule to determine storage requirements | |
|---|---|
| **Seismic** | *List how equipment is protected or schedule to protect.* |
| A FLEX Equipment Storage Building will be constructed on site to store FLEX-related equipment that will be used for FLEX implementation. The building will be built prior to the FLEX implementation date (Open Item 8) and will meet the requirements defined by NEI 12-06, Section 11.<br><br>The BSEP procedures and programs are being developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP (Open Item 9). | |

| **Flooding**<br>Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level | *List how equipment is protected or schedule to protect.* |
|---|---|
| A FLEX Equipment Storage Building will be constructed on site to store FLEX-related equipment that will be used for FLEX implementation. The building will be built prior to the FLEX implementation date (Open Item 8) and will meet the requirements defined by NEI 12-06, Section 11.<br>The BSEP procedures and programs are being developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP (Open Item 9). | |
| **Severe Storms with High Winds** | *List how equipment is protected or schedule to protect.* |
| A FLEX Equipment Storage Building will be constructed on site to store FLEX-related equipment that will be used for FLEX implementation. The building will be built prior to the FLEX implementation date (Open Item 8) and will meet the requirements defined by NEI 12-06, Section 11.<br>The BSEP procedures and programs are being developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP (Open Item 9). | |
| **Snow, Ice, and Extreme Cold** | *List how equipment is protected or schedule to protect.* |
| A FLEX Equipment Storage Building will be constructed on site to store FLEX-related equipment that will be used for FLEX implementation. The building will be built prior to the FLEX implementation date (Open Item 8) and will meet the requirements defined by NEI 12-06, Section 11.<br>The BSEP procedures and programs are being developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP (Open Item 9). | |
| **High Temperatures** | *List how equipment is protected or schedule to protect.* |
| A FLEX Equipment Storage Building will be constructed on site to store FLEX-related equipment that will be used for FLEX implementation. The building will be built prior to the FLEX implementation date (Open Item 8) and will meet the requirements defined by NEI 12-06, Section 11.<br>The BSEP procedures and programs are being developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP (Open Item 9). | |
| | |

| Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches) | | |
|---|---|---|
| **Strategy** | **Modifications** | **Protection of Connections** |
| *Identify Strategy including how the equipment will be deployed to the point of use.* | *Identify modifications.* | *Identify how the connection is protected.* |
| FLEX equipment will be stored inside the qualified structure. Dedicated FLEX vehicles, stored in the structure with the FLEX equipment, will deploy the equipment to the required locations. Debris removal/clearing vehicles and equipment will also be stored inside the qualified structure and will ensure that deployment vehicles have a clear path to their required locations.<br><br>Portable fuel transfer pumps will remove fuel from the Diesel Generator (DG) tanks (saddle and 4-day) to fill equipment fuel tanks. A vehicle will also be equipped with a fuel storage tank to transport fuel to locations in need of fuel. | Install FLEX connections at required locations. | The connection points for the FLEX equipment will be designed to withstand the applicable external hazards (Open Item 10). |
| **Notes:** None | | |

| Maintain Core Cooling | | |
|---|---|---|
| **BWR Portable Equipment Phase 3:** | | |
| The intent of Phase 3 is to obtain additional capability and redundancy from off-site equipment until power, water, and coolant injection systems are restored or commissioned. For Phase 3, large pumps and generators from off-site will provide 4160 VAC emergency bus power supply and provide long-term core cooling. | | |
| **Details:** | | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* | |
| BSEP 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. | | |
| **Identify modifications** | *List modifications.* | |
| • Provide a means of connecting the RRC equipment to the permanent plant equipment using standard connections (long term cooling and replenish clean water).<br>• See Safety Functions Support modifications for 4160 VAC electrical connections. | | |
| **Key Reactor Parameters** | *List instrumentation credited or recovered for this coping evaluation.* | |
| See parameters in Phase 1. | | |
| | | |
| **Deployment Conceptual Modification**<br>**(Attachment 3 contains Conceptual Sketches)** | | |
| **Strategy** | **Modifications** | **Protection of Connections** |
| *Identify Strategy including how the equipment will be deployed to the point of use.* | *Identify modifications.* | *Identify how the connection is protected.* |
| Equipment will be delivered from the RRC to the assembly area(s). From there, the equipment will be transported to the site and hooked-up by plant personnel per the playbook. Equipment will then be operated by plant procedures. | None | Connections will be designed to be consistent with Phase 2. |
| **Notes:** None | | |

| Maintain Containment |
|---|
| **Determine Baseline coping capability with installed coping[2] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06:**<br>• **Containment Venting or Alternate Heat Removal**<br>• **Hydrogen Igniters (Mark III containments only)** |
| **BWR Installed Equipment Phase 1:** |
| A coping time analysis was performed using MAAP for the 72-hour FLEX event [Ref. 4]. After reactor scram, the RPV is depressurized using SRVs, per technical specifications of 100°F per hour. RCIC aligned to the Suppression Pool is used for RPV makeup. When the Suppression Pool reaches 200°F, RCIC is aligned to the clean water tank for the remainder of the event.<br><br>RPV pressure is maintained using SRVs during the ELAP/FLEX event. The RPV is depressurized to 450 psia at 1 hour into the event. The RPV is depressurized to 200 psia at 2 hours into the event. RPV pressure is maintained around 200 psia using SRVs for the remainder of the event. The RPV is not fully depressurized for the duration of the event.<br><br>Suppression Pool water temperature is a limiting factor for implementation of the FLEX strategy. RCIC initially takes suction off the Suppression Pool. At 5.4 hours, the Suppression Pool water temperature reaches 200°F. At this time, RCIC suction is switched to the clean water tank. The maximum Suppression Pool temperature is 290.6°F. This occurs at 19.6 hours into the event.<br><br>Containment pressure limits are not expected to be reached during the event as indicated by the coping time analysis [Ref. 4], because the HCVS is opened prior to exceeding any containment pressure limits. The HCVS is opened at 19.5 hours into the coping time analysis. Containment pressure will be maintained below PCPL-A as directed by procedure 0EOP-02-PCCP, Primary Containment Control Procedure [Ref. 9], utilizing hardened wetwell vent as modified to comply with NRC Order EA-12-050 [Ref. 16].<br><br>Capacity of the clean water tank is a limiting factor for implementation of FLEX strategy. Approximately 375,000 gallons is required per unit in the clean water tank for RCIC injection.<br><br>As shown, containment parameters have been evaluated against design limits using MAAP. Containment integrity is not challenged and remains functional throughout the event. Monitoring of containment (drywell) pressure and temperature will be available via normal plant instrumentation.<br><br>It is shown that the Suppression Pool will exceed the design temperature of 220°F [UFSAR Table 6-3], but is acceptable based on review of original plant design and licensing documentation and analyses including, but not limited to, Design Report No. 7, Containment Design Report [Ref. 10]; Mark I Containment Severe Accident Analysis-Report to Mark I Owner's Group [Ref. 11]; and UE&C Study Report of the Containment Capability for Severe Accident Loadings [Ref. 12]. A more detailed study regarding the integrity of the Suppression Pool will be performed (Open Item 11). |

[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.

| Details: | |
|---|---|
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |

- BSEP 0EOP-02-PCCP, Rev 10, Primary Containment Control Procedure, exists to direct operators in protection and control of containment integrity, and procedures will be developed to support operation of the HCVS as modified to comply with NRC Order EA-12-050.
- Additionally, emergency procedures as directed by Primary Containment Control Procedure (PCCP) (i.e., supplemental emergency procedures, local emergency procedures, etc.) will be performed.
- BSEP 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 (Open Item 12).

| **Identify modifications** | *List modifications.* |
|---|---|

- A HCVS is currently installed, but will be modified in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents* (Open Item 13).

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

The instruments listed in the table below are available with loss of all AC power and UPS de-energized, per Attachment 3 of the SBO Procedure [Ref. 8].

As described in the Safety Functions Support section, these instruments are available during Phase 1 on station batteries. During Phase 2, SAMA diesel generators will be tied into MCCs to power the battery chargers, prior to battery depletion. During Phase 3, 4160 VAC power will be provided and this instrumentation will remain available. Therefore, through all three phases of the event, the instruments in the table below are available.

| Instrument | Parameter |
|---|---|
| C32-LI-R606A (N004A)<br>C32-LI-R606B (N004B)<br>C32-LI-R606C (N004C)<br>B21-LI-R604BX (N026B)<br>B21-LI-610 (N036)<br>B21-LI-3331 (3331)<br>B21-LI-5977 (5977) | RPV Level |
| B21-PI-R605A<br>B21-PI-R605B | RPV Pressure |
| CAC-PI-3341 | Drywell Pressure |
| CAC-LI-3342 | Suppression Pool Level |
| CAC-TR-778 PT 6<br>CAC-TR-778 PT 7 | Suppression Pool Temperature |
| CAC-TR-778 PT 1,3,4 | Drywell Temperature |
| CAC-TR-778 PT 5 | Suppression Chamber Air Temperature |

**Notes:** None

| Maintain Containment | |
|---|---|
| **BWR Portable Equipment Phase 2:** | |
| Containment integrity is maintained by permanently installed equipment. Restoration of power is required to operate the hardened wetwell vent in excess of 24 hours. 480 VAC power will be restored through FLEX equipment in Phase 2. See Equipment Power section of Safety Functions Support table for more information. | |
| **Details:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| See procedures in Phase 1. | |
| **Identify modifications** | *List modifications.* |
| • Re-size SAMA diesel generators to higher capacity. Refer to Safety Functions Support for further discussion on SAMA diesel geenator modifications. | |
| **Key Containment Parameters** | *List instrumentation credited or recovered for this coping evaluation.* |
| See parameters in Phase 1. | |
| | |
| **Storage / Protection of Equipment :**<br>**Describe storage / protection plan or schedule to determine storage requirements** | |
| **Seismic** | *List how equipment is protected or schedule to protect.* |
| The HCVS is currently installed, but will be modified in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, and guidance in JLD-ISG-2012-02 (Open Item 13). The HCVS will meet the design requirements as specified for reasonable protection per NEI 12-06.<br>Two SAMA diesel generators will be pre-staged and one will be stored in the FLEX Equipment Storage Building. See Safety Functions Support for more information. | |
| **Flooding**<br>Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level. | *List how equipment is protected or schedule to protect.* |
| The HCVS is currently installed, but will be modified in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, and | |

| **Maintain Containment** | |
|---|---|
| **BWR Portable Equipment Phase 2:** | |
| guidance in JLD-ISG-2012-02 (Open Item 13). The HCVS will meet the design requirements as specified for reasonable protection per NEI 12-06.<br>Two SAMA diesel generators will be pre-staged and one will be stored in the FLEX Equipment Storage Building. See Safety Functions Support for more information. | |
| **Severe Storms with High Winds** | *List how equipment is protected or schedule to protect.* |
| The HCVS is currently installed, but will be modified in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, and guidance in JLD-ISG-2012-02 (Open Item 13). The HCVS will meet the design requirements as specified for reasonable protection per NEI 12-06.<br>Two SAMA diesel generators will be pre-staged, and one will be stored in the FLEX Equipment Storage Building. See Safety Functions Support for more information. | |
| **Snow, Ice, and Extreme Cold** | *List how equipment is protected or schedule to protect.* |
| The HCVS is currently installed, but will be modified in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, and guidance in JLD-ISG-2012-02 (Open Item 13). The HCVS will meet the design requirements as specified for reasonable protection per NEI 12-06.<br>Two SAMA diesel generators will be pre-staged, and one will be stored in the FLEX Equipment Storage Building. See Safety Functions Support for more information. | |
| **High Temperatures** | *List how equipment is protected or schedule to protect.* |
| The HCVS is currently installed, but will be modified in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, and guidance in JLD-ISG-2012-02 (Open Item 13). The HCVS will meet the design requirements as specified for reasonable protection per NEI 12-06.<br>Two SAMA diesel generators will be pre-staged, and one will be stored in the FLEX Equipment Storage Building. See Safety Functions Support for more information. | |

| **Deployment Conceptual Design<br>(Attachment 3 contains Conceptual Sketches)** | | |
|---|---|---|
| **Strategy** | **Modifications** | **Protection of Connections** |
| *Identify Strategy including how the equipment will be deployed to the point of use.* | *Identify modifications.* | *Identify how the connection is protected.* |

| Maintain Containment | | |
|---|---|---|
| **BWR Portable Equipment Phase 2:** | | |
| HCVS is designed as permanently installed equipment. Deployment is required for pneumatic connections only. FLEX equipment will be stored inside the qualified structure.<br>Two SAMA diesel generators will be pre-staged. | Not applicable. | Pneumatic connection will be designed to withstand the applicable external hazards (Open Item 10).<br>See Safety Functions Support for protection of electrical connections associated with the SAMA diesel generators. |
| **Notes:** None | | |

| Maintain Containment | | |
|---|---|---|
| **BWR Portable Equipment Phase 3:** | | |
| The intent of Phase 3 is to obtain additional capability and redundancy from off-site equipment until power, water, and coolant injection systems are restored or commissioned. For Phase 3, large pumps and generators from off-site will provide 4160 VAC emergency bus power supply and provide long-term core cooling. | | |
| **Details:** | | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* | |
| See procedures in Phase 1. | | |
| **Identify modifications** | *List modifications.* | |
| • Provide a means of connecting the RRC equipment to the permanent plant equipment using standard connections (pneumatic supply for HCVS). | | |
| **Key Containment Parameters** | *List instrumentation credited or recovered for this coping evaluation.* | |
| See parameters in 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 is protected.* |
| Equipment will be delivered from the RRC to the assembly area(s). From there, the equipment will be transported to the site and hooked-up by plant personnel per the playbook. Equipment will then be operated by plant procedures. | None. | Connections will be designed to be consistent with Phase 2. |
| **Notes:** None | | |

| **Maintain Spent Fuel Pool Cooling** | |
|---|---|
| **Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06:**<br>• **Makeup with Portable Injection Source** | |
| **BWR Installed Equipment Phase 1:** | |
| During Phase 1, the SFP will heat up to boiling temperature at five hours [UFSAR Section 9.1.2.3.2.4.2.2] and begin to lose inventory at a rate of 65 gpm [UFSAR Section 9.1.2.3.2.4.2.2] due to boil-off. There is no equipment capable of providing spent fuel pool cooling in Phase 1. | |
| **Details:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| Not applicable. | |
| **Identify any equipment modifications** | *List modifications.* |
| • Modifications will be installed for the SFP level instrumentation per NRC Order EA-12-051. (Open Item 14) | |
| **Key SFP Parameter** | *List instrumentation credited or recovered for this coping evaluation.* |
| SFP level instrumentation is per NRC Order EA-12-051, *Issuance of Order to Modify Licenses With Regard to Reliable Spent Fuel Pool Instrumentation* [Ref. 17]. | |
| **Notes:** None | |

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

| Maintain Spent Fuel Pool Cooling | |
|---|---|
| **BWR Portable Equipment Phase 2:** | |
| During Phase 1, the SFP will heat up to boiling temperature at five hours [UFSAR Section 9.1.2.3.2.4.2.2] and begin to lose inventory at a rate of 65 gpm [UFSAR Section 9.1.2.3.2.4.2.2] due to boil-off. In Phase 2, the FLEX pump will be utilized off the clean water tank to provide SFP inventory. The primary connection point for SFP makeup is the Auxiliary Steam Supply to Residual Heat Removal (RHR) B Loop to Fuel Pool Cooling Assist connection. The alternate connection point for SFP makeup is Supplemental Spent Fuel Pool Cooling (SSFPC) piping to the Alternate Decay Heat Removal (ADHR) flange via portable hose.<br><br>The FLEX pump will be used to provide 250 gpm spray to the SFP via portable monitor nozzles from the refueling deck. | |
| **Schedule:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| BSEP 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. | |
| **Identify modifications** | *List modifications.* |
| • Install cross connect piping between the Auxiliary Steam Supply line and RHR B piping. See Attachment 3, Sketch 4 for more details.<br>• Design and pre-stage flange adapters for connection of FLEX pump discharge hose to SSFPC piping outside of Reactor Building and hose for connection between SSFPC and ADHR piping on 80 foot Reactor Building elevation. See Attachment 3, Sketch 4 for more details. | |
| **Key SFP Parameter** | *List instrumentation credited or recovered for this coping evaluation.* |
| SFP level instrumentation is per NRC Order EA-12-051, *Issuance of Order to Modify Licenses With Regard to Reliable Spent Fuel Pool Instrumentation.* | |
| | |
| **Storage / Protection of Equipment :**<br>**Describe storage / protection plan or schedule to determine storage requirements** | |
| **Seismic** | *List how equipment is protected or schedule to protect.* |
| See Maintain Core Cooling, BWR Portable Equipment Phase 2 for the FLEX equipment storage/protection plan. The hose used to provide spray to the SFP is stored with the FLEX equipment. | |

| | |
|---|---|
| **Flooding**<br>Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level. | *List how equipment is protected or schedule to protect.* |
| See storage/protection plan in Maintain Core Cooling, BWR Portable Equipment Phase 2 for FLEX equipment. The hose used to provide spray to the SFP is stored with the FLEX equipment. | |
| **Severe Storms with High Winds** | *List how equipment is protected or schedule to protect.* |
| See storage/protection plan in Maintain Core Cooling, BWR Portable Equipment Phase 2 for FLEX equipment. The hose used to provide spray to the SFP is stored with the FLEX equipment. | |
| **Snow, Ice, and Extreme Cold** | *List how equipment is protected or schedule to protect.* |
| See storage/protection plan in Maintain Core Cooling, BWR Portable Equipment Phase 2 for FLEX equipment. The hose used to provide spray to the SFP is stored with the FLEX equipment. | |
| **High Temperatures** | *List how equipment is protected or schedule to protect.* |
| See storage/protection plan in Maintain Core Cooling, BWR Portable Equipment Phase 2 for FLEX equipment. The hose used to provide spray to the SFP is stored with the FLEX equipment. | |

**Deployment Conceptual Design**
**(Attachment 3 contains Conceptual Sketches)**

| **Strategy** | **Modifications** | **Protection of Connections** |
|---|---|---|
| *Identify Strategy including how the equipment will be deployed to the point of use.* | *Identify modifications.* | *Identify how the connection is protected.* |
| The FLEX pump, hose, and monitor spray nozzle will be stored in the qualified structure.<br>FLEX equipment will be stored inside the qualified structure. Dedicated FLEX vehicles, stored in the structure with the FLEX equipment, will deploy the equipment to the required locations. Debris removal/clearing vehicles and equipment will also be stored | Install FLEX connections at required locations. | The connection points for the FLEX equipment will be designed to withstand the applicable external hazards (Open Item 10). |

| | | |
|---|---|---|
| inside the qualified structure and will ensure that deployment vehicles have a clear path to their required locations.<br><br>Portable fuel transfer pumps will remove fuel from the Diesel Generator (DG) tanks (saddle and 4-day) to fill equipment fuel tanks. A vehicle will also be equipped with a fuel storage tank to transport fuel to locations in need of fuel. | | |
| **Notes:** None | | |

| Maintain Spent Fuel Pool Cooling | |
|---|---|
| **BWR Portable Equipment Phase 3:** | |
| In Phase 3, SFP level will be maintained. | |
| **Schedule:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| BSEP 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. | |
| **Identify modifications** | *List modifications.* |
| • Provide a means of connecting the RRC equipment to the permanent plant equipment using standard connections (replenish clean water). | |
| **Key SFP Parameter** | *List instrumentation credited or recovered for this coping evaluation.* |
| SFP level instrumentation is per NRC Order EA-12-051, *Issuance of Order to Modify Licenses With Regard to Reliable Spent Fuel Pool Instrumentation.* | |

| Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches) | | |
|---|---|---|
| **Strategy** | **Modifications** | **Protection of Connections** |
| *Identify Strategy including how the equipment will be deployed to the point of use.* | *Identify modifications.* | *Identify how the connection is protected.* |
| Equipment will be delivered from the RRC to the assembly area(s). From there, the equipment will be transported to the site and hooked-up by plant personnel per the playbook. Equipment will then be operated by plant procedures. | None | Connections will be designed to be consistent with Phase 2. |
| **Notes:** None | | |

| Safety Functions Support | |
|---|---|
| **Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications.** | |
| **BWR Installed Equipment Phase 1** | |
| **Equipment Power**<br>The Power Distribution System and/or the EDGs provide power to the 480 VAC Emergency Buses (E-Buses 5, 6, 7, and 8) at BSEP. These E-Buses provide power to critical loads for achieving and maintaining safe shutdown. Upon an ELAP, these AC loads will be de-energized. As a result, DC Power is required during ELAP with LUHS to power critical functions including (but not limited to) RCIC, HPCI, SRVs, vital instrumentation, emergency communications equipment, and essential lighting. The battery chargers are de-energized during a BDBEE, leading to a loss of 125/250 VDC and associated functions in about two hours [Ref. 8].<br>BSEP currently relies on the SBO procedure [Ref. 8] to reduce non-essential DC loads as necessary to minimize battery discharge rate. In Phase 1, there is no method to restore DC power once the batteries are depleted; therefore, deep load-shedding strategies will extend the two hour coping time to approximately five hours. These deep loading shedding strategies do not have to be completed if Phase 2 power becomes available from at least one SAMA diesel generator.<br>**Equipment Operating and Habitability Limits**<br>SBO heatup calculations performed in accordance with NUMARC 87-00 show that equipment operability will not be challenged during heatup in vital locations such as the Reactor Building Emergency Core Cooling (ECCS) Rooms. RCIC equipment room is expected to reach 145.3°F during an SBO event [Ref. 15]. The expected temperature in the HPCI room is 153.6°F, which is a backup to RCIC in a FLEX event. These temperatures are below the maximum normal temperatures of the associated rooms [Ref. 14].<br>Operator manual action occurrence in areas where habitability is a concern will be minimized and a path for natural air circulation in the areas will be provided. | |
| **Details:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |

[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.

- Deep load-shedding procedures will be developed to extend coping time for station batteries (Open Item 15).
- Modify procedures such that operator manual actions, in areas where habitability is a concern, occur early in the FLEX timeline, to the extent practical, while conditions are expected to be habitable (Open Item 16).
- Revise procedures to open Reactor Building doors to provide a natural air circulation path (Open Item 17).
- BSEP 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.

| **Identify modifications** | *List modifications.* |
|---|---|

None

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

The instruments listed in the table below are available with loss of all AC power and UPS de-energized, per Attachment 3 of the SBO Procedure [Ref. 8].

As described in the Safety Functions Support section, these instruments are available during Phase 1 on station batteries. During Phase 2, the SAMA diesel generators will be tied into MCCs to power the battery chargers, prior to battery depletion. During Phase 3, 4160 VAC power will be provided and this instrumentation will remain available. Therefore, through all three phases of the event, the instruments in the table below are available.

| Instrument | Parameter |
|---|---|
| C32-LI-R606A (N004A)<br>C32-LI-R606B (N004B)<br>C32-LI-R606C (N004C)<br>B21-LI-R604BX (N026B)<br>B21-LI-610 (N036)<br>B21-LI-3331 (3331)<br>B21-LI-5977 (5977) | RPV Level |
| B21-PI-R605A<br>B21-PI-R605B | RPV Pressure |
| CAC-PI-3341 | Drywell Pressure |
| CAC-LI-3342 | Suppression Pool Level |
| CAC-TR-778 PT 6<br>CAC-TR-778 PT 7 | Suppression Pool Temperature |
| CAC-TR-778 PT 1,3,4 | Drywell Temperature |
| CAC-TR-778 PT 1,3,4 | Suppression Chamber Air Temperature |

**Notes:** None

**Safety Functions Support**

**BWR Portable Equipment Phase 2**

**Equipment Power**

As in Phase 1, power is required to maintain availability of SRVs, RCIC, (HPCI as backup) and vital instrumentation. During Phase 2, the only available DC power is from station batteries. Continuous DC power will be maintained at the site using the SAMA diesel generators to connect to battery chargers to provide power to DC loads.

Two 400 kW, 480 VAC 60 Hz diesel generators, referenced as 2-SAMA-Diesel-1 and 2-SAMA-Diesel-2, will be used to power the 125/250 VDC battery chargers. The SAMA diesel generators are able to power MCCs (1CA, 1CB, 2CA, and 2CB) which feed the 125/250 VDC battery chargers. Each SAMA diesel generator will be capable of powering both unit Division II battery chargers, any required MOVs, Division II battery fans, and desired AC instrumentation as power is available. An additional portable SAMA diesel generator is available to meet the N+1 equipment requirement. This will be stored in the qualified structure with other FLEX equipment and deployed if necessary.

**Equipment Operating and Habitability Limits**

See discussion in Safety Functions Support, BWR Portable Equipment Phase 1. In addition, operator manual action occurrence in areas where habitability is a concern will be minimized and a path for natural air circulation in the areas will be provided. If necessary, high volume fans will force air through the areas to lower temperatures and improve habitability.

**Details:**

| | |
|---|---|
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |

- Modify procedures such that operator manual actions in areas where habitability is a concern occur early in the FLEX timeline to the extent practical, while conditions are expected to be habitable.
- Revise procedures to open Reactor Building doors to provide natural circulation path and utilize high volume fans if necessary to provide forced circulation throughout Reactor Buildings to improve habitability in these areas.
- BSEP 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.

| Identify modifications | List modifications. |
|---|---|

- Re-size the SAMA diesel generators to higher capacity. Purchase a portable SAMA diesel generator to meet N+1 requirement of NEI 12-06. The N+1 SAMA diesel generator would be connected at an appropriate connection point. Add SAMA diesel generator connection points so that the SAMA diesel generator can tie into the Division II of the alternate unit. That is, the 2-SAMA-Diesel-1 diesel generator should add a tie into the 2CB bus and 2-SAMA-Diesel-2 diesel generator should add a tie into the 1CB bus. The SAMA diesel generator switch should be modified to support providing charging loads to any of the three connected divisions. See Attachment 3, Sketch 6 for more details.
- Pre-stage the SAMA diesel generators in a qualified configuration. Store the N+1 SAMA diesel generator in the FLEX Equipment Storage Building.
- Install modified breakers with quick connection points on MCCs 1CA, 1CB, 2CA, and 2CB to provide a secondary connection for repowering the MCCs. See Attachment 3, Sketch 6 for more details.

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

See instrumentation in Phase 1.

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

| **Seismic** | *List how equipment is protected or schedule to protect.* |
|---|---|

The SAMA diesel generators will be pre-staged in a qualified configuration. FLEX related equipment needed for Safety Functions Support, along with the N+1 SAMA diesel generator, will be stored in the FLEX Equipment Storage Building.

| **Flooding**<br>Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level. | *List how equipment is protected or schedule to protect.* |
|---|---|

The SAMA diesel generators will be pre-staged in a qualified configuration. FLEX related equipment needed for Safety Functions Support, along with the N+1 SAMA diesel generator, will be stored in the FLEX Equipment Storage Building.

| **Severe Storms with High Winds** | *List how equipment is protected or schedule to protect.* |
|---|---|

The SAMA diesel generators will be pre-staged in a qualified configuration. FLEX related equipment needed for Safety Functions Support, along with the N+1 SAMA diesel generator, will be stored in the FLEX Equipment Storage Building.

| Snow, Ice, and Extreme Cold | *List how equipment is protected or schedule to protect.* | |
|---|---|---|
| The SAMA diesel generators will be pre-staged in a qualified configuration. FLEX related equipment needed for Safety Functions Support, along with the N+1 SAMA diesel generator, will be stored in the FLEX Equipment Storage Building. | | |
| **High Temperatures** | *List how equipment is protected or schedule to protect.* | |
| The SAMA diesel generators will be pre-staged in a qualified configuration. FLEX related equipment needed for Safety Functions Support, along with the N+1 SAMA diesel generator, will be stored in the FLEX Equipment Storage Building. | | |
| | | |
| **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 is protected.* |
| **Strategy** | **Modifications** | **Protection of Connections** |
| Two SAMA diesel generators and associated cables will be pre-staged.<br>The N+1 SAMA diesel generator will be deployed, if necessary, adjacent to the pre-staged qualified SAMA diesel generators and will utilize their connections. | None. | Electrical connection points designed to withstand the applicable external hazards (Open Item 10). |
| **Notes:** None | | |

| Safety Functions Support | |
|---|---|
| **BWR Portable Equipment Phase 3** | |
| The intent of Phase 3 is to obtain additional capability and redundancy from off-site equipment until power, water, and coolant injection systems are restored or commissioned. For Phase 3, large pumps and generators from off-site will provide 4160 VAC emergency bus power supply and provide long-term core cooling. | |
| **Details:** | |
| **Provide a brief description of Procedures / Strategies / Guidelines** | *Confirm that procedure/guidance exists or will be developed to support implementation.* |
| BSEP 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. | |
| **Identify modifications** | *List modifications.* |
| • Provide hook up for RRC supplied 4160 VAC generator to supply power to E-Buses. See Attachment 3, Sketch 7 for more details.<br>• Install permanent electrical cabling from within the E4 and E1 4160 VAC Switchgear Rooms down to the 20 foot elevation of the Diesel Generator Building (DGB) with quick-disconnect connections on each end to accommodate the RRC 4160 VAC generator. See Attachment 3, Sketch 8 for more details. | |
| **Key Parameters** | *List instrumentation credited or recovered for this coping evaluation.* |
| See parameters in 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 is protected.* |
| Equipment will be delivered from the RRC to the assembly area(s). From there, the equipment will be transported to the site and hooked-up by plant personnel per the playbook. Equipment will then be operated by plant | Provide a means of connecting the RRC equipment to the permanent plant equipment using standard connections. | Connections will be designed to be consistent with Phase 2. |

| Safety Functions Support | | |
|---|---|---|
| **BWR Portable Equipment Phase 3** | | |
| procedures. | | |
| **Notes:** None | | |

| BWR Portable Equipment Phase 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Use and (potential / flexibility) Diverse Uses* | | | | | | *Performance Criteria* | *Maintenance* |
| **Portable Equipment** | **Core** | **Containment** | **SFP** | **Instrumentation** | **Accessibility** | | **Maintenance / PM Requirements** |
| Three (3) 300 HH Sullair Diesel Air Compressor | | X | | | | 300 cfm / 200 psig | Will follow EPRI template requirements. |
| Two (2) Hale Pumps | X | | X | | | 3000 gpm @ 150 psig | Will follow EPRI template requirements. |
| Two (2) Electric Fuel Oil Transfer Pumps and associated equipment | X | X | X | | | 25 gal/min | Will follow EPRI template requirements. |
| Two (2) Deployment Vehicles | | | | | X | Diesel; Means to deploy equipment, provide fuel replenishment capabilities, etc. | Will follow EPRI template requirements. |
| Four (4) Flatbed Trailers | X | | X | | | Means to store and transport hoses, strainers, cables, and miscellaneous equipment. | Will follow EPRI template requirements. |
| Hoses, strainers, and fittings | X | | X | | | | Will follow EPRI template requirements. |
| Two (2) Monitor Nozzles for SFP Spray | | | X | | | | Will follow EPRI template requirements. |
| Two (2) SAMA diesel generators (Pre-Staged) | X | X | X | X | X | 400 kW | Will follow EPRI template requirements. |
| One (1) N+1 SAMA diesel generator and associated cabling | X | X | X | X | X | 400 kW | Will follow EPRI template requirements. |

| BWR Portable Equipment Phase 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Use and (potential / flexibility) Diverse Uses* | | | | | | *Performance Criteria* | *Maintenance* |
| **Portable Equipment** | **Core** | **Containment** | **SFP** | **Instrumentation** | **Accessibility** | | **Maintenance / PM Requirements** |
| Two (2) High Volume Fans | | | | | X | | Will follow EPRI template requirements. |
| Duct (cooling/heating units) | | | | | X | 14-inch Duct, 100 feet | Will follow EPRI template requirements. |
| Radiation Protection Equipment | | | | | X | | For surveys, clearing equipment from RCA, survey and clearing of vehicles/personnel. |
| Debris Removal Equipment | | | | | X | | Will follow EPRI template requirements. |

| BWR Portable Equipment Phase 3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Use and (potential / flexibility) Diverse Uses*** | | | | | | ***Performance Criteria*** | ***Notes*** |
| **Portable Equipment** | **Core** | **Containment** | **SFP** | **Instrumentation** | **Accessibility** | | |
| 3 to 4 MWe DG set | X | X | X | X | X | Large DG with supporting cabling and fuel oil up to our 4160 VAC bus. | Will hook up to the 4160 VAC bus with a modified ground truck. |
| Two (2) Low Pressure Cooling Pumps | X | | X | | | 5000 gpm, 100 psia | Provide source of flow from Discharge/Intake Canal to RHRSW heat exchangers for Shutdown Cooling. One pump per unit. |
| Diesel Fuel | X | X | X | X | X | 20,000 gallons of additional diesel fuel. | Delivered over time in tanker trucks. |
| Two (2) 4160 VAC Transformers | X | X | X | X | X | | |
| Four (4) 480 VAC Transformers | X | X | X | X | X | | |
| One (1) Water Purification Skid | X | | X | | | At least 20,000 gal/day capacity. | Needs to have desalination and regeneration capability. |
| Large Heat Exchangers | X | X | X | | | Plate heat exchangers provide the most BTU capacity for the size. | |
| Two (2) 50,000 Fresh Water Tankers | X | | X | | | | Additional fresh water if site supplies are depleted. |

| BWR Portable Equipment Phase 3 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Use and (potential / flexibility) Diverse Uses*** | | | | | | | ***Performance Criteria*** | ***Notes*** |
| **Portable Equipment** | **Core** | **Containment** | **SFP** | **Instrumentation** | **Accessibility** | | | |
| Two (2) Spare Battery Chargers for the 125V DC System | X | X | X | X | | | Skid mounted on wheels. | |
| Water Removal and Storage | | | | | | | Storage capability for 100,000 gallons of contaminated water. | |
| Temporary Housing | | | | | | | Temporary living for onsite personnel. | |
| Six (6) Portable Ventilation Fans | X | X | X | X | | | | |

| Phase 3 Response Equipment/Commodities | |
|---|---|
| **Item** | **Notes** |
| **Radiation Protection Equipment**<br>• Survey instruments<br>• Dosimetry<br>• Off-site monitoring/sampling | An analysis will be performed to determine radiation protection equipment requirements. |
| **Commodities**<br>• Food<br>• Potable water<br>• Sanitary Facilities | An analysis will be performed to determine commodities requirements. |
| **Fuel Requirements**<br>• Diesel Fuel | An analysis will be performed to determine site-specific fuel consumption rates and available supplies. |
| **Heavy Equipment**<br>• Transportation equipment<br>• Debris clearing equipment | Transportation equipment will be provided to move large skids/trailer-mounted equipment provided from off site (Open Item 18). |

# Attachment 1A
# Sequence of Events Timeline

| Action Item | Time Completed (hours) | Action | Time Constraint Y/N [5] (hours) | Remarks/ Applicability |
|---|---|---|---|---|
| 1. | 0 | BDBEE occurs.<br>▪ Reactor scram<br>▪ Automatic Actions occur as designed | N/A | The event occurs at T = 0. |
| 2. | 0.25 | SBO is declared and load shedding begins. | N | Emergency DC oil pumps will be cycled off as turbines coast down and H2 vented. |
| 3. | 1.0 | Depressurize RPV to 150-300 psig. | N | > 100°F/hr per 0AOP-36.2 |
| 4. | 4.0 | SAMA diesel geenrators started and loaded. | 5.0 | Critical Division II on both units. |
| 5. | 1.25 | Deep load shedding is completed. | 1.25 | Not required if at least one SAMA diesel generator is in service supplying Division II on both units. |
| 6. | 5 | Perform and complete manual actions on 117 foot Reactor Building for SFP spray and Reactor Building natural circulation. | N | Actions should be taken as soon as possible. |
| 7. | 5.4 | RCIC must be aligned to the clean water tank. | 5.4 | Assumes CST is lost during BDBEE. Time based on MAAP run Suppression Pool to 200°F. |
| 8. | 9.0 | Align SAMA diesel generators to 480 VAC; power for MOVs, AC instruments, battery room fans, etc. (critical load 24/48 VDC battery chargers). N+1 SAMA diesel generator deployed and loaded, if necessary. | 24 | FLEX procedural guidance for AC loads to be established. HCVS will require 24 volt battery charger within 24 hours. |

[5] Instructions: Provide justification if No or NA is selected in the Time Constraint column. If yes, include technical basis discussion as requires by NEI 12-06 Section 3.2.1.7.

| Action Item | Time Completed (hours) | Action | Time Constraint Y/N [5] (hours) | Remarks/ Applicability |
|---|---|---|---|---|
| 9. | 19.5 | Vent containment via HCVS. | 19.5 | Assumes primary containment pressure. Time based on MAAP run.<br><br>Takes place prior to exceeding PCPL-A (70 psia). |
| 10. | 24 | Establish FLEX pump connection to SFP makeup.<br><br>Clean water tank; Auxiliary Steam Supply to RHR B. | 56.8 | Detail design to establish methodology to validate proper flow rate to Unit 1 and Unit 2 (least resistance concern). |
| 11. | 24 | Transition from Phase 2 to Phase 3. | 72 | None |

# Attachment 1B
# NSSS Significant Reference Analysis Deviation Table
# (NEDC 33771P, GEH Evaluation of FLEX Implementation Guidelines)

| Item | Parameter of Interest | NEDC Value (NEDC 33771P Revision 1, January 2013) | NEDC Page | Plant Applied Value | Gap and Discussion |
|---|---|---|---|---|---|
| | None | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

# Attachment 2
# Milestone Schedule

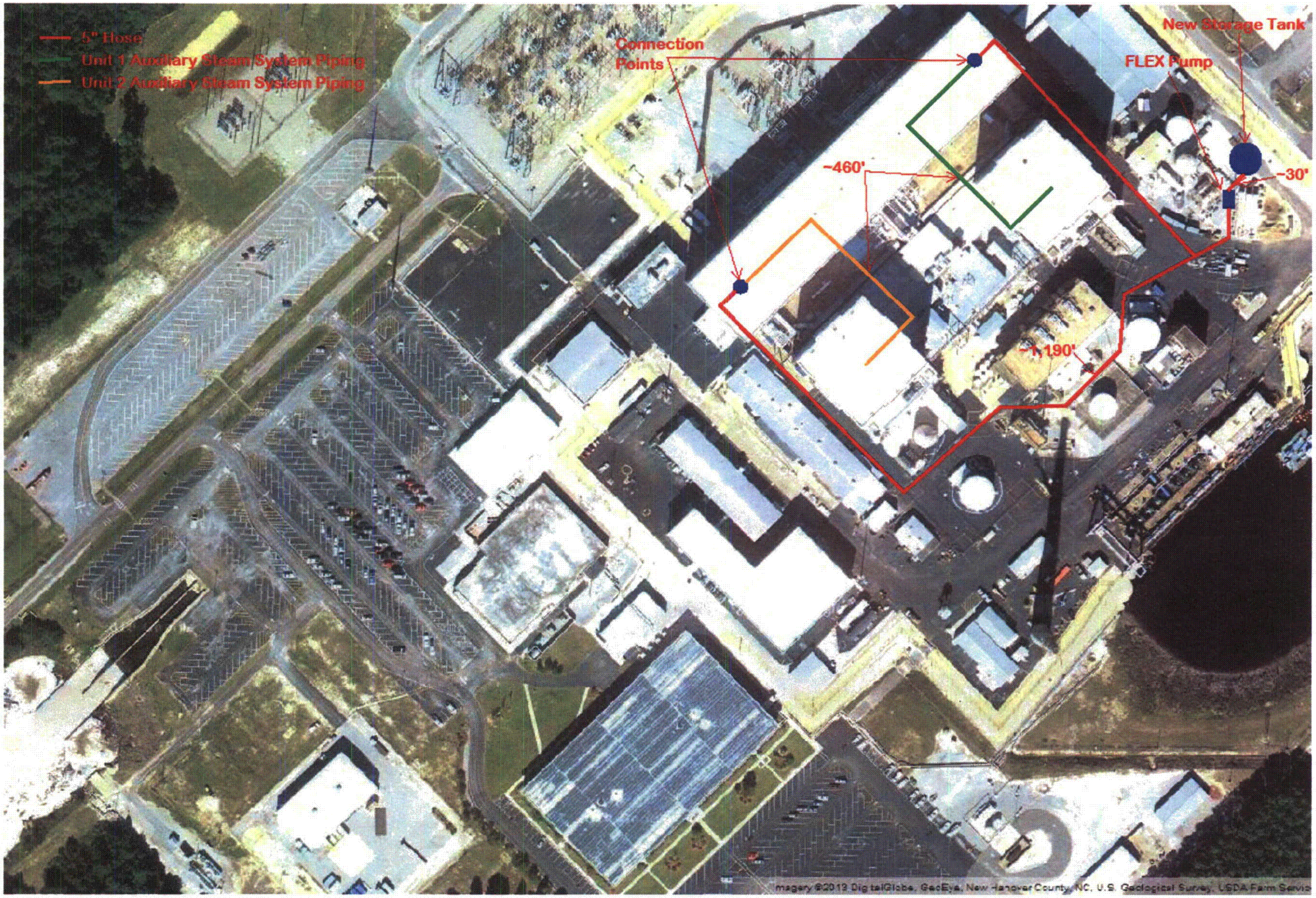
The FLEX Implementation milestone schedule is provided below. The dates are planning dates subject to change as design and implementation details are developed. Changes to the Original Target Dates will be reflected in the subsequent 6 month status reports.

| Original Target Date | Activity | Status (Includes Date Changes) |
|---|---|---|
| Oct. 2012 | Submit 60 Day Status Report | Complete |
| 2/28/13 | Submit Overall Integrated Implementation Plan | Complete |
| 8/30/13 | Submit 6 Month Status Report | |
| 11/29/2013 | Perform Staffing Analysis | |
| 2/28/14 | Submit 6 Month Status Report | |
| 3/27/14 | Develop Unit 2 Modification Engineering Change (EC) Packages, including Storage Facility | |
| 3/30/14 | Perform station-specific analysis following generic BWROG FLEX implementation analysis review (Open Item 19) | |
| 4/1/2014 | Develop Strategies/Contract with RRC | |
| 8/29/14 | Submit 6 Month Status Report | |
| (Unit 2) 01/27/14<br>(Unit 1) 01/26/15 | SAT Process for Training | |
| (Unit 2) 07/27/14<br>(Unit 1) 07/26/15 | Develop Training Plan | |
| (Unit 2) 11/27/14<br>(Unit 1) 11/26/15 | Procure Equipment | |
| (Unit 2) 11/27/14<br>(Unit 1) 11/26/15 | Procure Additional FLEX Equipment | |
| (Unit 2) 01/27/15<br>(Unit 1) 01/26/16 | Create Maintenance Procedures | |
| (Unit 2) 01/27/15<br>(Unit 1) 01/26/16 | Procedure Changes incorporating response strategies | |
| (Unit 2) 02/27/15<br>(Unit 1) 02/26/16 | Implement Training | |
| 2/27/15 | Submit 6 Month Status Report | |
| March 2015 | Unit 2 Implementation Outage | |
| 3/26/15 | Develop Unit 1 Modification EC Packages | |

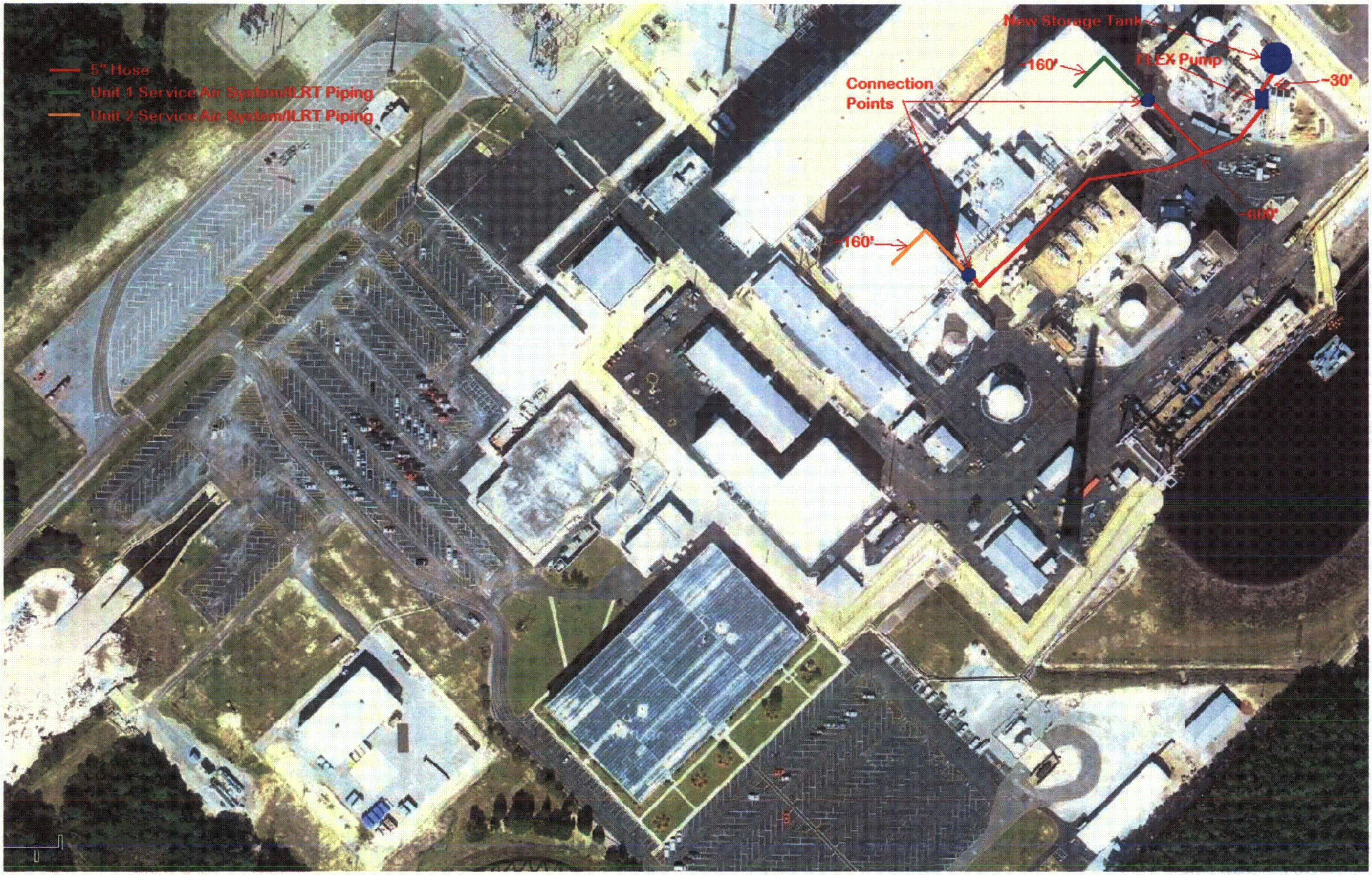
| Original Target Date | Activity | Status (Includes Date Changes) |
|---|---|---|
| 8/31/15 | Submit 6 Month Status Report | |
| (Unit 2) April 2015<br>(Unit 1) April 2016 | Implement Modifications | |
| 2/29/16 | Submit 6 Month Status Report | |
| March 2016 | Unit 1 Implementation Outage | |
| (Unit 2) April 2015<br>(Unit 1) April 2016 | Submit Completion Report | |
| 8/31/16 | Submit 6 Month Status Report | |

# Attachment 3
# Conceptual Sketches

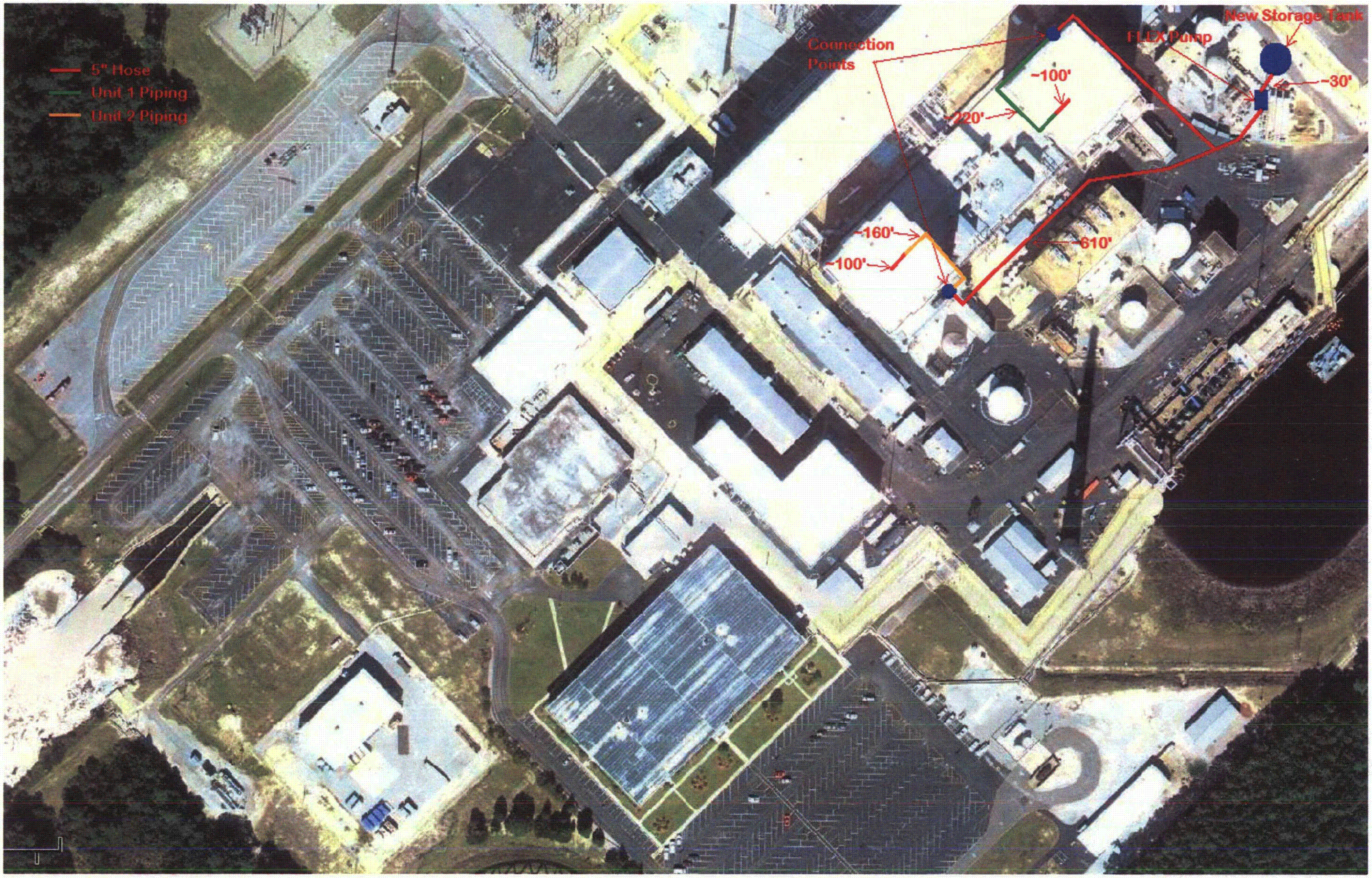
# Sketch 1


5" Hose
Unit 1 Auxiliary Steam System Piping
Unit 2 Auxiliary Steam System Piping
Connection Points
New Storage Tank
FLEX Pump
~30'
~460'
~1,190'
Imagery ©2013 DigitalGlobe, GeoEye, New Hanover County, NC, U.S. Geological Survey, USDA Farm Servic

# Sketch 2

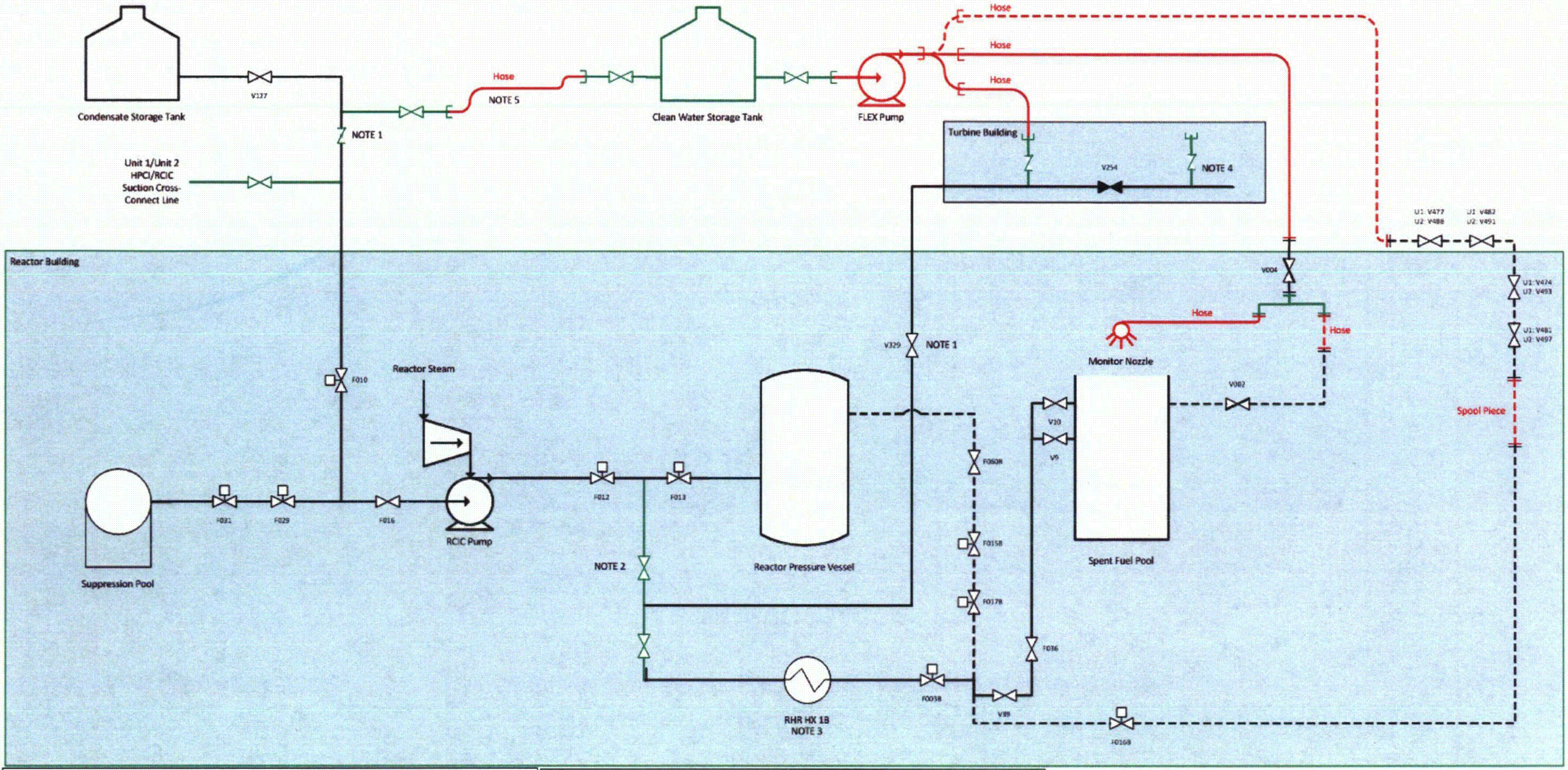

5" Hose
Unit 1 Service Air System/ILRT Piping
Unit 2 Service Air System/ILRT Piping
New Storage Tank
FLEX Pump
~30'
~160'
Connection
Points
~160'
~600'

# Sketch 3


5" Hose
Unit 1 Piping
Unit 2 Piping
Connection Points
New Storage Tank
FLEX Pump
~100'
~220'
~30'
~160'
~100'
~610'

# Sketch 4

## Flow Diagram for FLEX Strategies




| Summary of Strategy Attributes for Core Cooling Function (Phases 1 & 2) | | | | |
|---|---|---|---|---|
| Safety Function | Method | Phase | Strategy Attributes | Additional |
| Reactor Core Cooling and Heat Removal | RCIC | 1 | Use of RCIC with suction from SP or the CST | CST may not be available following Seismic/High Wind Event |
| | RCIC | 2 | Use of RCIC with suction from Clean Water Storage Tank | RCIC may fail due to SP heat up |
| | RCIC | 2 | Injection through RCIC discharge line with FLEX pump | Available for all BDBEEs |
| | RHR | 2 | Injection through ILRT piping into RHR Loop B with FLEX pump | May be unavailable following Seismic/High Wind Event |

| Summary of Strategy Attributes for Spent Fuel Pool Cooling Function (Phase 2) | | | | |
|---|---|---|---|---|
| Safety Function | Method | Phase | Strategy Attributes | Additional |
| Spent Fuel Pool Cooling | RHR | 2 | Injection through RHR Loop B Fuel Pool Cooling Assist Piping with FLEX Pump | Available for all BDBEEs |
| | SSFPC | 2 | Injection through SSFPC/ADHR Primary Loop Piping with FLEX Pump | Maybe unavailable following Seismic/High Wind Event |

Primary / Alternate
- Currently Installed Equipment
- New Permanent FLEX Equipment
- Temporary FLEX Equipment

NOTES

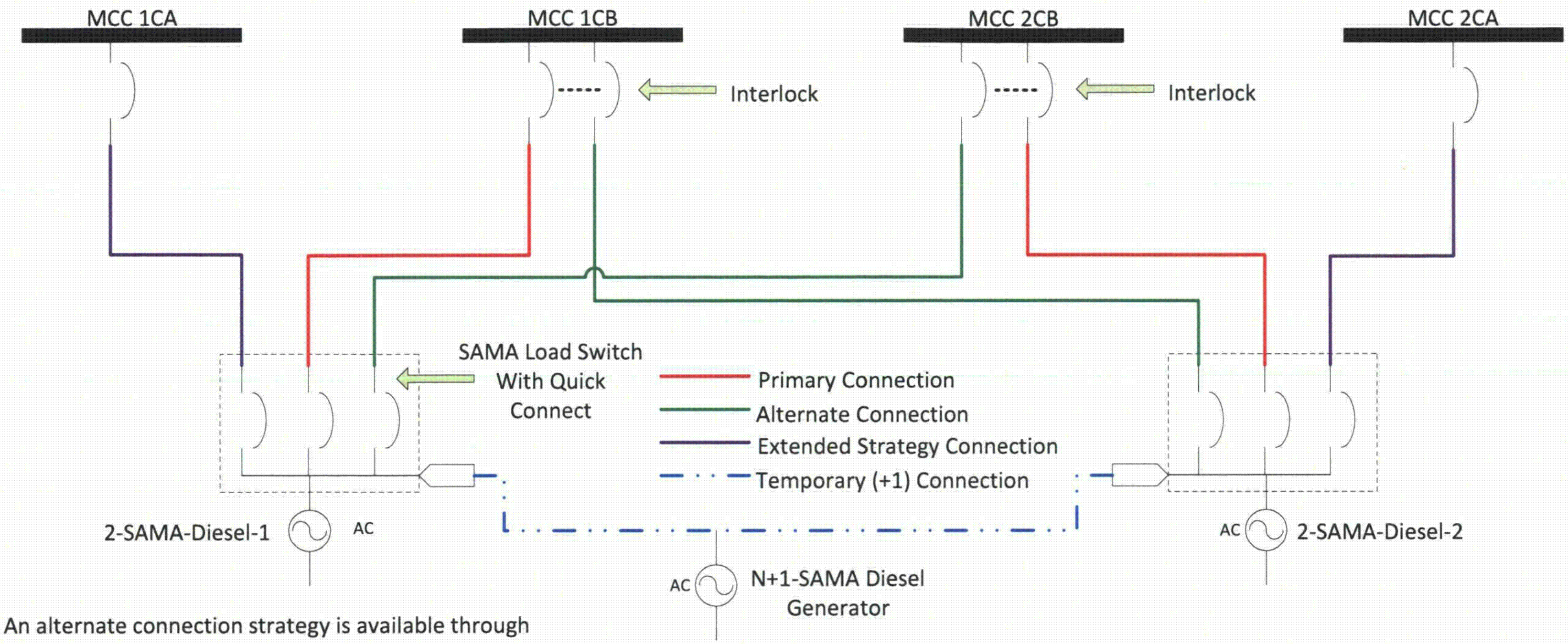
1. Unit 2 Only
2. Interconnection of Auxiliary Steam Supply Piping and RCIC/RHR Piping will be via Steam Condensing Mode pipe off RHR for Unit 2
3. Flow through HX will be dependent on final design
4. Connection for alternate unit
5. Necessity of booster pump between clean water storage tank and RCIC pump suction will be dependent on final design

| FLEX STRATEGIES | |
|---|---|
| DATE: 2/17/13 | EC 88932 |

# Sketch 5


PROPOSED FLEX BUILDING LOCATION
TECHNICAL TRAINING CENTER
N
NEXUS TECHNICAL SERVICES CORPORATION
NEXUS ENGINEERING
SHT. 1 OF 1
CONCEPTUAL DESIGN
FLEX RESPONSE BUILDING
NUCLEAR GENERATING PLANT
XXXXXXX-XX-XXXXXX-X
SIZE D

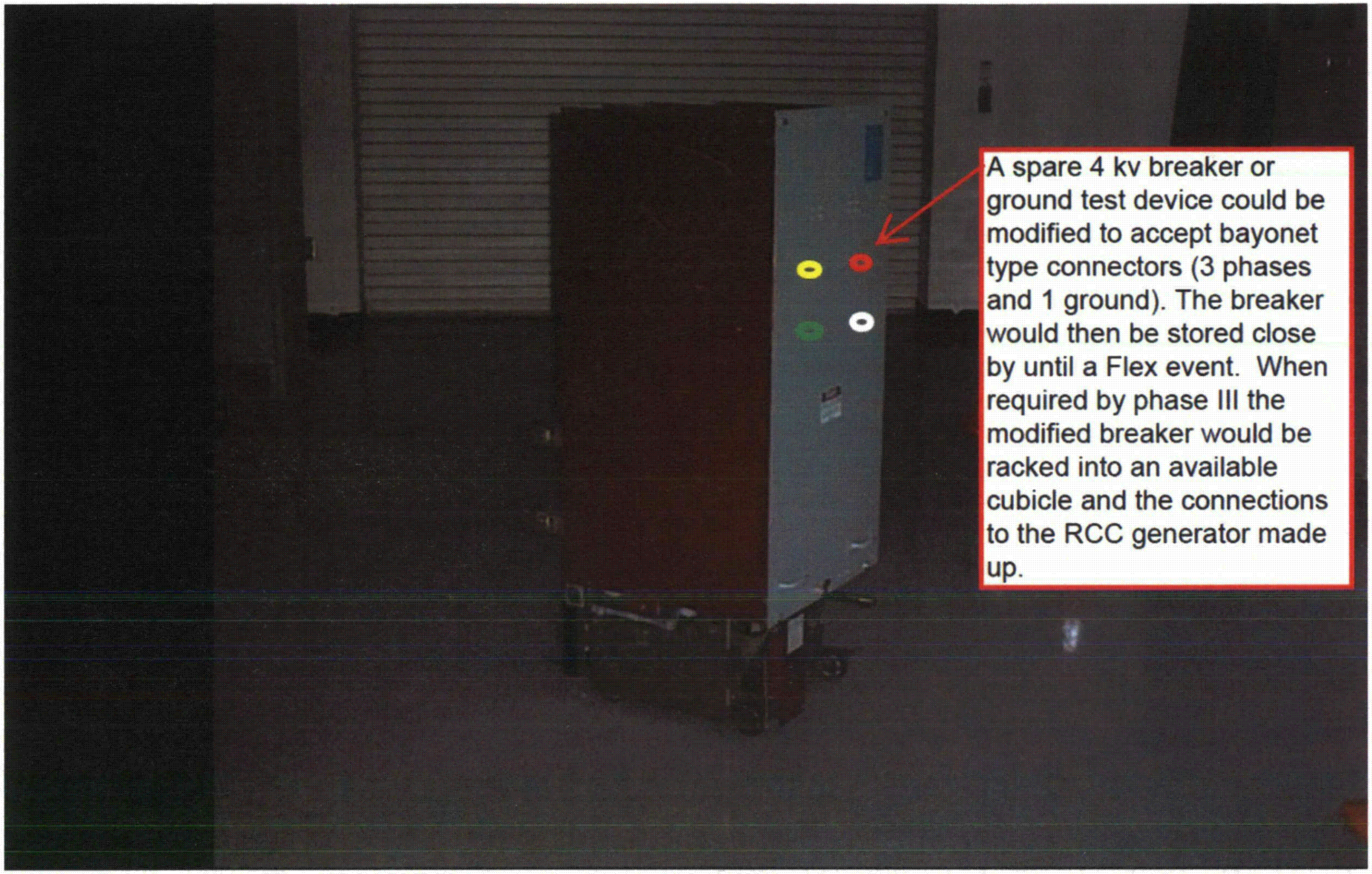
# Sketch 6



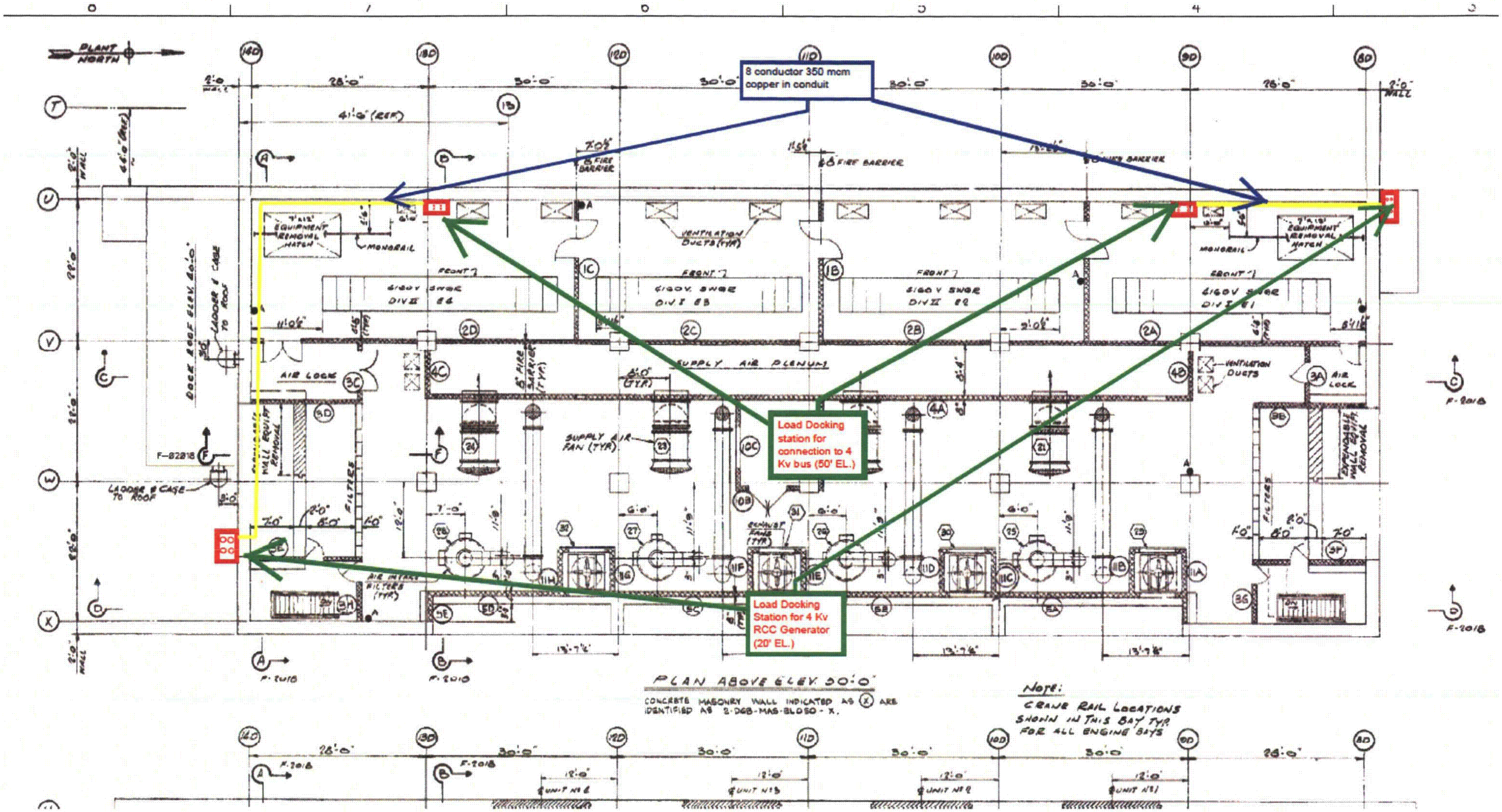

An alternate connection strategy is available through cables pre-staged in the Cable Spreading Room. These will allow a SAMA diesel generator to be directly connected to the MCCs in the event of a malfunction of the permanently installed electrical connection.

| FLEX DIESEL GENERATORS | |
|---|---|
| DATE: 2/17/13 | EC 88932 |

# Sketch 7


A spare 4 kv breaker or ground test device could be modified to accept bayonet type connectors (3 phases and 1 ground). The breaker would then be stored close by until a Flex event. When required by phase III the modified breaker would be racked into an available cubicle and the connections to the RCC generator made up.

# Sketch 8


PLANT NORTH
8 conductor 350 mcm copper in conduit
Load Docking station for connection to 4 Kv bus (50' EL.)
Load Docking Station for 4 Kv RCC Generator (20' EL.)
SUPPLY AIR PLENUM
SUPPLY AIR FAN (TYP)
PLAN ABOVE ELEV. 50'-0"
Note:
CRANE RAIL LOCATIONS SHOWN IN THIS BAY TYP. FOR ALL ENGINE BAYS

# Attachment 4
# References

The following references are provided for information only. Their inclusion within this document does not incorporate them into the current licensing basis (CLB) by reference nor does it imply an intent to do so. References which have not been docketed are available onsite for NRC examination and inspection.



| Ref # | Document Title |
|---|---|
| 1 | NEI 12-06, Revision 0, *Divese and Flexible Coping Strategies (FLEX) Implementation Guide* |
| 2 | EA-12-049, *Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, March 12, 2012 (ML12054A735) |
| 3 | NEDC-33771P, Revision 1, *Project Task Report BWROG GEH Evaluation of FLEX Implementation Guidelines* |
| 4 | EC 88932 Attachment Z02R0, BNP FLEX – Coping Time Analysis, CN-AEO-13-0001, Revision 0 |
| 5 | 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, August 29, 2012 (ML12229A174) |
| 6 | SD-16, *Reactor Core Isolation Cooling (RCIC) System*, Revision 11 |
| 7 | BWROG, *RCIC Pump and Turbine Durability Evaluation – Pinch Point Study*, Revision 0 |
| 8 | 0AOP-36.2, *Station Blackout*, Revision 52 |
| 9 | 0EOP-02-PCCP, *Primary Containment Control Procedure*, Revision 10 |
| 10 | Design Report No. 7, *Containment Design Report* |
| 11 | CBI NA-CON, *Mark I Containment Severe Accident Analysis-Report to Mark I Owner's Group*, April 1987 |
| 12 | UE&C Study Report of the Containment Capability for Severe Accident Loadings, 7992.104-S-S-046 |
| 13 | SD-19, *High Pressure Coolant Injection (HPCI) System*, Revision 22 |
| 14 | 0EOP-03-SCCP, *Secondary Containment Control Procedure*, Revision 8 |
| 15 | 8S42-M-03, *Station Blackout – Loss of HVAC*, Revision 4 |
| 16 | EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents*, March 12, 2012 (ML12054A694) |
| 17 | EA-12-051, *Issuance of Order to Modify Licenses With Regard to Reliable Spent Fuel Pool Instrumentation*, March 12, 2012 (ML12054A679) |

# Attachment 5
# Open Items

| Ref # | Open Item Description |
|---|---|
| 1 | Perform a formal validation of FLEX deployment, connection, and action timelines after the procedural guidance is developed and related staffing study is completed. |
| 2 | Implement programmatic controls. |
| 3 | Develop plant equipment control guidelines, in accordance with NEI 12-06 Section 11.5, to manage the unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy. |
| 4 | Establish programs and process to assure personnel proficiency in the mitigation of beyond-design-basis events is developed and maintained in accordance with NEI 12-06 Section 11.6. |
| 5 | Maintain FLEX strategies in overall FLEX basis documents. |
| 6 | Modify existing plant configuration control procedures to ensure that changes to the plant design, physical plant layouts, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with NEI 12-06 Section 11.8. |
| 7 | Complete applicable training prior to the implementation of FLEX. |
| 8 | Complete construction of FLEX Equipment Storage Building prior to the implementation of FLEX. |
| 9 | Develop BSEP procedures and programs to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to BSEP. |
| 10 | Design FLEX equipment connection points (e.g. mechanical, pneumatic, and electrical) to withstand the applicable external hazards. |
| 11 | Perform study to validate Suppression Pool temperatures exceeding 220°F. |
| 12 | Develop site specific procedures or guidelines, utilizing the industry developed guidance from the Owners' Groups, EPRI, and NEI Task team, to address the criteria in NEI 12-06. |
| 13 | Modify the current HCVS in accordance with NRC Order EA-12-050, *Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents.* |
| 14 | Complete SFP level instrumentation modifications per NRC Order EA 12-051, *Issuance of Order to Modify Licenses With Regard to Reliable Spent Fuel Pool Instrumentation.* |
| 15 | Developed deep load-shedding procedures to extend coping time for station batteries. |
| 16 | Modify procedures such that operator manual actions, in areas where habitability is a concern, occur early in the FLEX timeline, to the extent practical. |
| 17 | Revise procedures to open Reactor Building doors to provide a natural air circulation path. |

| Ref # | Open Item Description |
|---|---|
| 18 | Provide transportation equipment to move large skids/trailer-mounted equipment provided from off site. |
| 19 | Review generic BWROG analysis of FLEX implementation and perform station-specific analysis (NEDC 33771P, Revision 1) [Ref. 3] |