February 28, 2013

L-2013-084
10 CFR 2.202

FPL

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

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389

Florida Power & Light (FPL)/St. Lucie's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events dated March 12, 2012, Accession No. ML12056A045.

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, Accession No. ML12229A174.

3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August, 2012, Accession No. ML12242A378.

4. FPL Letter L-2013-385 dated October 25, 2012, FPL'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 25, 2012, Accession No. ML12300A421.

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to FPL/St. Lucie. Reference 1 was immediately effective and directs FPL/St. Lucie to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

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

Reference 4 provided the FPL/St. Lucie initial status report regarding mitigation strategies, as required by Reference 1.

A151
NRR

Florida Power & Light Company

6501 S. Ocean Drive, Jensen Beach, FL 34957

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms FPL/St. Lucie has received Reference 2 and has an Overall Integrated Plan developed in accordance with the guidance for defining and deploying strategies that will enhance the ability to cope with conditions resulting from beyond-design-basis external events.

The information in the attachment provides the FPL/St. Lucie Overall Integrated Plan for mitigation strategies pursuant to Reference 3. The enclosed Integrated Plan is based on conceptual design information that is current as of this letter. As design details and associated procedural guidance are finalized, additional information, as well as revisions to the information contained in the enclosure to this letter, will be communicated to the NRC in the 6-month Integrated Plan updates as required by Reference 1.

This letter contains no new regulatory commitments.

If there are any questions regarding this submittal, please contact Eric Katzman, St. Lucie Licensing Manager, at (772) 467-7748.

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

Executed on February 28, 2013.

Respectfully submitted,

Joseph Jensen
Site Vice President
St. Lucie Plant

Attachment - St. Lucie Plant FLEX Integrated Plan

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator
NRC Resident Inspector

DIVERSE AND FLEXIBLE COPING STRATEGIES

(FLEX)

INTEGRATED PLAN

REVISION 0

IN RESPONSE TO NRC ORDER EA-12-049

MITIGATION STRATEGIES FOR

BEYOND-DESIGN-BASIS EXTERNAL EVENTS

ST. LUCIE NUCLEAR PLANT

UNITS 1 & 2

FLORIDA POWER AND LIGHT COMPANY

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PSL General Integrated Plan Elements (PWR)	
Determine Applicable Extreme External Hazard **Ref: NEI 12-06 section 4.0 -9.0** **JLD-ISG-2012-01 section 1.0**	St. Lucie Plant (PSL) used NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Rev 0, August 2012, Section 4.0 – 9.0 and Appendix B to evaluate applicable external hazards. Four classes of hazards apply to PSL: 1. Seismic 2. Flooding 3. Storms and High Wind including wind driven missiles 4. High Temperature PSL is located on Hutchinson Island, St. Lucie County, Florida. Unit 1 – latitude 27°20'58" north and longitude 80°14'48" west and Unit 2 - 27°20'55" north and longitude 80°14'47" west. (Ref. 2, Section 2.1, Geography and Demography) **Seismic:** • The design criteria for PSL accounts for two design basis earthquake spectra, Operating Basis Earthquake (OBE) and Design Basis Earthquake (DBE). Structures, systems, and components (SSCs) important to safety are designed to withstand loads developed from these spectra. Provisions for this hazard will be included in the FLEX integrated plan. This includes qualification of installed equipment credited for the event and effects of the event on the FLEX strategies. Seismic design of St. Lucie safety related SSCs is discussed in the UFSAR (Ref. 2, Chapter 3, Section 3.7, Seismic Design) • A seismic re-evaluation of the site required by the 10 CFR 50.54(f) letter of March 12, 2012 has not been completed. Once completed, insights from the re-evaluation will be included in the development of the FLEX integrated plan. Pending Action 1 **External Flooding:** • External flooding design of St. Lucie safety related structures is discussed in UFSAR, Section 3.4, Water Level (Flood) Design. Flood protection criteria applied to plant structures, systems and components is listed in Table 3.2-1. (Ref. 2) • Per section 3.4.1 of the UFSAR, plant grade is at elevation +18', Unit 1 and +18.5', Unit 2 and minimum entrance level to all safety related buildings is +19.5 feet. Maximum elevation of roadways is +19.0 feet, thus any ponding of water that might

	result will be below the building entrances. (Ref. 2) • The plant is located at approximately 27° north latitude, 80° west longitude on Hutchinson Island, a barrier island, situated between the Atlantic Ocean and the Indian River. The plant is situated above the highest possible water levels attainable except for wave run-up resulting from probable maximum hurricane (PMH) considerations. The maximum hurricane surge results in a still water elevation of 17.2 feet mean low water (MLW) and wind induced waves to 18.0 ft MLW. (Ref. 2, Unit 2 UFSAR, Section 2.4.2.2.b) Based upon the probable maximum flood (PMF) high water level due to the PMH, wave run-up level and plant island elevation noted above, flood protection stop logs at entrances (whose minimum elevation is at least +19.5 feet) to safety-related buildings are not deemed necessary. Additional wave run-up protection is provided to entrances of the Fuel Handling Building (FHB) and Reactor Auxiliary Building (RAB) by the presence of adjacent buildings and structures. Since no permanent structures are located on the south side of Unit 2 RAB, additional wave run-up protection has been provided by installing stop logs in the entrance on the south wall and the southern most entrance on the east wall of Unit 2 RAB. (Ref. 2, Unit 2 UFSAR Section 3.4.1) • A flooding re-evaluation is being performed as required by 10 CFR 50.54(f) letter of March 12, 2012 and will be submitted to the NRC by 3/12/15 for PSL. The re-evaluation will include an updated storm surge assessment, a local intense precipitation assessment, and the effects of Tsunami, and Seiche. Once completed, insights from the re-evaluation will be included in the development of the FLEX integrated plan. Pending Action 2 **Storms and High Winds:** • PSL is a coastal site and is subject to hurricane hazards. Hurricanes and tornado hazards will be addressed for the PSL site, as PSL is situated near the 240 mph hurricane contour shown in Figure 7-1 of NEI 12-06. (Ref. 46) • High winds and Tornado loadings are discussed in the UFSAR, Chapter 3, Section 3.3, Wind and Tornado Loadings. (Ref. 2) • Per UFSAR, the design hurricane wind speed is 194 mph. Wind loads are applied to all seismic Class 1 structures based on this design wind speed. (Ref. 2, Unit 2 UFSAR Section 3.3.1.1, Unit 1 UFSAR Section 3.3.1)

	• Section 3.3.2 of the UFSAR states design tornado has a horizontal rotational wind speed of 300 mph and translational speed of 60 mph. The design tornado wind speed applied to St. Lucie is extremely conservative since Florida tornados are much less severe. (Ref. 2, Sections 3.3.2 and 2.3) • Plant procedures require that for a Category 4 or 5 Hurricane, the units shall be shutdown to Mode 5, at least two (2) hours before the projected onset of sustained hurricane force winds within the Owner Controlled Area (Ref. 48, Section 3.2). **Snow, Ice and Low Temperature:** • PSL is located in South Florida below the 35th parallel. Per Section 8 of NEI 12-06, (Ref. 46) snow, ice, or extreme cold hazard conditions do not apply to PSL. Provisions for this hazard will not be included in the FLEX integrated plan. **High Temperature:** • The climate at PSL is typical of that in southern Florida, being hot and humid in the summer and mild in the winter. The PSL site (Hutchinson Island) average maximum temperature ranges from 72° F in February to 87° F in August (Ref. 2, UFSAR Unit 1, Table 2.3-10). • UFSAR Tables 2.3-10, Unit 1 and 2.3-37, Unit 2, (Ref. 2) illustrate the monthly distribution of temperature and extremes recorded in the area. Long term temperature statistics for West Palm Beach (climate characteristics are very similar to Hutchinson Island) indicate a 101° F maximum extreme and a 27° F minimum extreme (Ref. 2, UFSAR Unit 2, Table 2.3-37). • It is not expected that FLEX equipment and deployment would be affected by high temperature; however, high temperature will be considered with respect to maintaining equipment within design ratings and for personnel habitability. References: See Attachment 4.
Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • Considerations and assumptions for the ELAP at PSL are consistent with section 3.2.1, General Criteria and Baseline Assumptions in NEI 12-06. (Ref. 46)

	• Flooding 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. Pending Action 1, 2 • Off-site resources (personnel, equipment, etc.) will begin arriving at hour 6 and full staffing is expected by 24 hours into the event. • This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (AC) power and loss of normal access to the ultimate heat sink resulting from a beyond-design-basis event by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications and/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). (Ref. 3). • Spent fuel in dry cask storage is outside the scope of Order EA-12-049 and therefore not addressed in the response strategies described in this report. • Initial requested portable equipment will arrive at the site staging area from the Regional Response Center (RRC) within 24 hours with the remainder of larger equipment arriving after 72 hours. References: See Attachment 4.

Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01 NEI 12-06 13.1**	With the exception of the following, full compliance with JLD-ISG-2012-01 and NEI 12-06 is expected. Where there are interpretations of NEI-12-06 or the NRC Interim Staff Guidance requirements, St. Lucie will follow those interpretations jointly developed by the NRC and NEI. 1. Deviation from NEI-12-06 Section 3.2.2(13) is being taken with respect to use of a charging pump for RCS makeup and boration. Section 3.2.2(13) addresses the transition from Phase 1 installed equipment to Phase 2 equipment and stipulates that portable pump capability is required for RCS makeup. Table D-1, allowing repowering of charging pumps only, is inconsistent with this requirement. Per NEI response on FLEX Guidance Inquiry Form 2013-06, "... Table D-1 would allow a strategy of re-powering an installed charging pump as the Phase 2 strategy without requiring a portable pump. Either strategy should be an acceptable strategy but if the strategy to re-power a charging pump is selected, then the integrated plan submittal should justify its acceptability and note that a deviation from Section 3.2.2(13) is being taken." The PSL RCS Inventory coping strategy relies on repowering one of three installed charging pumps in each unit. Each charging pump motor breaker will be capable of being powered on its input and load sides from a 480 VAC FLEX generator. The approach meets diversity requirements, powers separate trains of equipment, and is deemed to be acceptable under NEI-12-06. With the above exceptions, full compliance is expected in the spring of 2015 for Unit 1 and the fall of 2015 for Unit 2.
Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7 JLD-ISG-2012-01 section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walk through of deployment).* Sequence of Events Timeline is provided as Attachment 1A. Justifications for time constraints within the time line that are designated as "Y" are provided in this section. The timeline and this section present a generic timeline for Modes 1-5 with steam generators available and a list of additional actions required when plant is in Mode 6 and 5 without steam generators.

	MODES 1 – 5, SGs AVAILABLE **Time 0 - 1 hour** **Establish Control Room Cross-Flow Ventilation** Control Room heat up evaluation (Ref. 12) assumed inverter loads and inverters are shed after 30 minutes and DC Lighting is shed after one hour. Cross-flow ventilation will be established. Further Engineering evaluation will be performed to identify any additional strategies required to maintain acceptable control room temperatures during an ELAP. Pending Action 11 Time validation studies will be conducted to justify the time constraints and resources for establishing post BDBEE ventilation to the control room. Pending Action 27 **Time 0.5 – 1 hour** **DC and Extended DC Load Shedding** The essential instrumentation and control functions will be maintained by 125 VDC Class 1E batteries, which are designed to power the safety related DC loads (including instrumentation) for a minimum of four hours without any requirements for load shedding. However, in order to extend the capacity of the batteries further, the non-essential loads will be shed early in the event. Extended load shedding is capable of increasing the duration of the battery powered instrumentation monitoring function on Unit 1 to approximately 12 hours and 11 hours for 1A and 1B station batteries respectively; and on Unit 2 to approximately 10 hours and 9 hours for 2A and 2B station batteries respectively. (Ref. 8, 9) An 8-hour battery discharge capacity will be assumed to conservatively bound these calculated maximum battery discharge durations, which credit extended load shedding. During Phase 1 of an ELAP, load shedding will be performed as outlined in station procedures (Ref 50, 51) with alterations as described in the extended load shed analysis (Ref. 8, 9) for the Class 1E batteries within 60 minutes of the ELAP. Based on the limited design capacity of the Class 1E batteries, substantial load shedding must be initiated early at approximately thirty minutes into the event in order to successfully extend the battery discharge time from 4 hours to at least 8 hours. The Inverters C & D, which feed the MC & MD instrument buses will be shed in the first 30 minutes, with steps taken to preclude any potential spurious equipment operation, which may result from their de-energization. Smaller loads identified as not required for safe shutdown will be load shed after 1 hour. This option utilizes existing plant equipment to demonstrate regulatory compliance for the required functions. 1(2)-EOP-99 (Ref.

51) revised to incorporate the extended load shedding strategy.

Time validation studies will be conducted to justify the time constraints and resources for completing DC load shedding within the specified time period. Pending Action 26

Time 0 - 2 hours
<u>Open Fuel Handling Building Doors and Route Hoses for Spent Fuel Pool Makeup and Spray Strategy Paths</u>

The FLEX SFP coping strategy is reliant upon onsite personnel actions to open all FHB doors and stage hoses for makeup or spray on the refuel floor. The Fuel Handling Building door will be opened to provide a ventilation pathway for steam from the SFP. These limited actions are taken in Phase 1 before SFP conditions prevent Fuel Handling Building (FHB) access.

These actions will be taken very early in the event if a full core discharge had just been completed and can be delayed for other times. The SFP strategy is the same for Modes 1 through 6.

Time validation studies will be conducted to justify the time constraints and resources for establishing FHB ventilation paths and the staging of SFP makeup/spray capability. Pending Action 30

Time 6 - 8 hours
<u>Deploy 480 VAC FLEX Diesel Generator</u>

A 480 VAC FLEX Diesel Generator will be deployed, staged and connected to repower a station 480 VAC bus within eight hours to ensure power is available to the battery chargers prior to depletion of the station batteries. In order to ensure that the batteries remain available until the 480 VAC FLEX Diesel Generator is operational extended manual load shedding will be used. Extended manual load shedding will increase the duration of the battery powered instrumentation monitoring function on Unit 1 to approximately 12 hours and 11 hours for 1A and 1B station batteries respectively; and on Unit 2 to approximately 10 hours and 9 hours for 2A and 2B station batteries respectively (Refs. 8, 9).

A modification to the Class 1E 480 VAC Switchgear 1A2 (2A2) and 1B2 (2B2) will add a transfer switch allowing a quick connection to the 480 VAC FLEX Diesel Generator. In addition, alternate transfer switches will be added in order to permit the charging pumps and Class 1E battery chargers to be directly energized in the event the 480 V distribution bus is damaged. This will provide an alternate connection point for the 480 VAC FLEX Diesel Generator(s). Conceptual sketches are provided in Figure 1, Figure 2.

	Time validation studies will be conducted to justify the time constraints and resources for the deployment of a 480 VAC diesel generator to the station 480 VAC bus or directly to a designated piece of equipment. Pending Action 31. **Time 8 hours** **Battery Chargers in Service and Battery Room Ventilation Established** The battery chargers will be placed in service to restore power to DC loads and resume charging batteries. This action is necessary to ensure power remains available to control room instrumentation and control functions prior to battery depletion. The Battery Rooms require ventilation be established prior to commencing battery charging. Time validation studies will be conducted to justify the time constraints and resources for establishing post BDBEE ventilation to the Battery rooms. Pending Action 28 **Time 10 - 12 hours** **Deploy SG FLEX Pump for SG Makeup** In Modes 1-5 with SGs available, deployment of the SG FLEX pump as part of the Phase 1 RCS Cooling strategy is a contingency measure in the event of a loss of the TDAFW flow due to failure of the pump/ turbine. The SG FLEX pump cannot support SG injection until approximately 12 hours into the event. This is based on 10 hours at hot standby, followed by a 4 hour cooldown at 75°F/hr to a SG pressure of 120 psia. Pump requirements are 300 gpm at 300 psig. (Ref. 5) Time validation studies will be conducted to justify the time and resources required for the deployment of the SG FLEX pumps for steam generator makeup. Pending Action 35 **Time 10+ hours** **Restore Power to SIT Outlet MOVs** RCS cooldown will commence after 10 hours. By this time the 480 VAC FLEX generator will be connected to 480 VAC bus. This allows for battery chargers and other selected loads to be powered. SIT motor operated outlet isolation valves will have power restored prior to RCS cooldown. This will provide capability of isolating SITs following SIT fluid injection and prior to nitrogen injection. Time validation studies will be conducted to justify the time and

	resources required to restore power to the SIT isolation MOVs. Pending Action 37 **Time 12 hours** **<u>Cross-connect Unit 1 & 2 CSTs</u>** The larger Unit 2 CST will be cross-connected with the Unit 1 CST to extend the time period before the CST FLEX pump must be deployed to augment the CST volumes with water from the RWTs or other available sources. Without cross-connecting, the Unit 1 CST volume will be depleted in approximately 16 hours and the Unit 2 CST in approximately 43 hours (Ref. 15, 66). Requirements for cross-tie completion are based on a nominal 4 hours prior to Unit 1 CST depletion. Time validation studies will be conducted to justify time and resources required for cross-connecting CSTs. Pending Action 33 **Time 15 - 17 hours** **<u>Deploy CST FLEX Pump for CST Fill</u>** Deployment of the CST pump during Phase 1 of the RCS cooling is a contingency measure taken to ensure adequate water supplies for core cooling. The CST FLEX pump will be used in Phase 2 to refill the CSTs and/or the RWT depending on the Mode requirements prior to depletion of the CSTs. Refill capability at 17 hours is well in advance of the depletion of the combined Unit 1 & 2 CST volumes at approximately 29 hours (Ref. 15, 66). The CST FLEX pump will take suction from the RWT or other available tank and discharge to the Unit 2 CST which can then supply the Unit 1 CST. Protected connections will be installed on the outlet of the RWTs and both CSTs to allow for filling either CST tank directly. Figure 12. Time validation studies will be conducted to justify time and resources required for deployment of CST FLEX pumps. Pending Action 34 **<u>MODE 6 & 5, SGs NOT AVAILABLE</u>** **Time 0 - 1 hour** **<u>Establish Gravity Feed Flowpath from RWT</u>** The RWT gravity feed strategy provides RCS makeup during a station blackout. Establishing the flow path in one hour precludes core uncovery in the bounding mid-loop configuration. This is a time critical requirement that does not afford a 2 hour margin. When at mid-loop, plant procedures (Ref. 58) require independent RCS level indications be continuously monitored by a dedicated Operator

	and address level restoration by multiple means including gravity feed (Ref. 54). Time validation studies will be conducted to re-validate time and resources required for establishing the RWT gravity flow path to RCS. Pending Action 38 **Time 0 - 1 hour** **<u>Vent Containment</u>** Containment pressurization must be prevented to provide sufficient RWT gravity feed for RCS makeup. Venting containment within 1 hour supports gravity feed flow requirements, ensures sufficient time for SG FLEX pump deployment and prevents subsequent pressurization that would challenge containment design conditions. Time validation studies will be conducted to re-validate time and resources required for venting containment. Pending Action 41 **Time 0 - 2 hours** **<u>Isolate Fuel Transfer Tube</u>** If the fuel transfer tube path is open, then valve V4111, Isolation Valve For Fuel Transfer Tube Penetration (P-25), shall be closed or the transfer tube blind flange installed. The fuel transfer tube path is closed to provide containment isolation and prevent introduction of seawater into the refueling cavity from the SFP. The 2 hour time frame can be accomplished before containment and SFP conditions prevent access to both locations. Time validation studies will be conducted to justify time and resources required for isolating Fuel Transfer Tube path. Pending Action 42 **Time 4 - 6 hours** **Isolate CCW Flow to Containment Cooler Penetrations** With once-through-cooling to containment, the CCW penetrations for the containment coolers will be manually isolated to prevent steam generation within the water circuit (RCB penetrations P-15 through P-24). Voiding is to be avoided as it complicates the Phase 3 strategy to re-establish CCW flow in support SDC operation. The 4 - 6 hour timing is completed 2 hours prior to the expected time at which containment temperatures exceed 212°F. Time validation studies will be conducted to justify time and resources required for isolate CCW Flow to Containment Cooler Penetrations. Pending Action 44

	Time 6 – 8 hours **<u>Deploy SG FLEX Pump for RCS makeup</u>** SG FLEX pump is used to inject water from the RWT into the RCS cold legs via a connection located downstream of the LPSI pumps. Staging of the SG FLEX pump is performed in the first 6 - 8 hours following the event in order to support a nominal 10 hour deployment criteria when the RCS is steaming through the power operated relief valves (PORVs). Deployment is time critical only when the Phase 1 RWT gravity feed strategy is needed and is not available due to PORV use. Time validation studies will be conducted to justify time and resources required for deploying SG FLEX Pump for RWT injection to RCS. Pending Action 39
Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes.* FLEX Equipment Storage Building (FESB) will be located on south side of the plant and east of the Independent Spent Fuel Storage Installation (ISFSI) area. On-site deployment routes for FLEX equipment from the FESB are shown in Figure 9. On-site FESB deployment routes will be analyzed for liquefaction. Pending Action 4 The staging area for the Regional Response Center (RRC) equipment has not been finalized. The RRC staging area location will be finalized and deployment routes from the RRC staging area to the site will be developed. Pending Action 5
Provide a milestone schedule. This schedule should include: • **Modifications timeline** o **Phase 1 Modifications** o **Phase 2 Modifications** o **Phase 3 Modifications** • **Procedure guidance development complete** o **Strategies** o **Maintenance** • **Storage plan (reasonable protection)** • **Staffing analysis**	*The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports. See attached milestone schedule Attachment 2* See Attachment 2 for Milestone Schedule.

completion • **FLEX equipment acquisition timeline** • **Training completion for the strategies** • **Regional Response Centers operational** **Ref: NEI 12-06 section 13.1**	
Identify how the programmatic controls will be met. **Ref: NEI 12-06 section 11** **JLD-ISG-2012-01 section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section.* *See section 6.0 of JLD-ISG-2012-01.* PSL will implement a FLEX program stipulating the required administrative controls to be implemented (Pending Action 100). FLEX equipment will be procured as commercial equipment unless credited for other functions; then the quality attributes of the other functions apply. 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. Existing plant maintenance programs will be used to identify and document maintenance and testing requirements. Preventative Maintenance (PM) work orders will be established and testing procedures will be developed in accordance with the PM program. Testing and PM frequencies will be established based on type of equipment and considerations made within Electric Power Research Institute (EPRI) guidelines. The control and scheduling of the PMs will be administered under the existing site work control processes. PSL will assess the addition of program description into the UFSAR, and Technical Requirements Manual.
Describe training plan	*List training plans for affected organizations or describe the plan for training development* A Systematic Approach to Training (SAT) will be used to evaluate training requirements for station personnel based upon changes to plant equipment, implementation of FLEX portable equipment, and new or revised procedures that result from implementation of the FLEX strategies. Training modules for personnel that will be responsible for

	implementing the FLEX strategies, and Emergency Response Organization (ERO) personnel will be developed to ensure personnel proficiency in the mitigation of beyond-design-basis external events. The training will be implemented and maintained per existing PSL training programs. The details, objectives, frequency, and success measures will follow the plant's Systematic Approach to Training (SAT) process. FLEX training will ensure that personnel assigned to direct the execution of mitigation strategies for BDBEEs will achieve the requisite familiarity with the associated tasks, considering available job aids, instructions, and mitigating strategy time constraints. Training will be completed prior to final implementation of the requirements of this order on Unit 1 in March of 2015.
Describe Regional Response Center plan	The nuclear industry will establish two Regional Response Centers (RRC) to support utilities during beyond design basis external events. Contracts are in place to develop RRC facilities to support Phase 3 FLEX strategies, purchase equipment, and maintain the equipment. Each RRC will hold five sets of equipment, four of which will be able to be fully deployed when requested, and the fifth set will have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local Staging Area, established by the Strategic Alliance for FLEX Emergency Response (SAFER) team and the utility. Pending Action 3 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 will be delivered to the RRC staging area within 24 hours from the initial request with larger items arriving within 72 hours.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.	

Maintain Core Cooling & Heat Removal

Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

- **AFW/EFW**
- **Depressurize SG for Makeup with Portable Injection Source**
- **Sustained Source of Water**

Ref: JLD-ISG-2012-01 section 2 and 3

PWR Installed Equipment Phase 1

Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain core cooling. Identify methods (AFW/EFW) and strategy(ies) utilized to achieve this coping time.

For a Beyond Design Basis External Event (BDBEE) with significant warning, such as a hurricane, both units will be shutdown at the time of the event. The Severe Weather Preparations procedure (Ref. 48) instructs the operators to shutdown and cooldown the plant to Mode 3 or 5 (with steam generators available) at least two hours prior to the projected onset of hurricane force winds. The actual mode is dependent on the category of the projected hurricane and determinations by plant personnel. On-site resources are significantly increased in advance of the projected storm. The procedure also directs operators top off major water tanks, fuel oil tanks and increase plant staffing and supplies. Therefore, prior to the arrival of hurricane induced flooding and high winds, the plant is in a unique state and well prepared to cope with the event.

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

Immediately following the Extended Loss of Alternating Current Power (ELAP) event, reactor core cooling is accomplished by natural circulation of the Reactor Coolant System (RCS) through the steam generators (SG). The steam generators are supplied makeup water by the auxiliary feedwater (AFW) system and steam pressure is controlled by the atmospheric dump valves (ADVs).

Unit 1 ADVs are air operated valves. If instrument air is not available, steam pressure will initially be controlled by the operation of the main steam safety valves (MSSVs). The field operators will install pneumatic jumpers from the seismically installed compressed gas backup to the ADVs to provide a local control capability. The compressed gas supply (high pressure gas bottles) will be sized to last 120 hours. Additional bottles can be readily swapped out to extend the time frame indefinitely. Unit 2 ADVs are DC powered and do not require field operators to support their operation.

The makeup source for this strategy is the turbine-driven auxiliary feedwater (TDAFW) pump, which is automatically actuated to provide feedwater to the steam generators for the removal of reactor core decay heat following a loss of main feedwater. The TDAFW pump supplies flow to both steam generators through individual (DC powered) motor-operated flow control valves (FCVs).

[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.

Unit 2 also has flow path DC powered solenoid valves that open on Auxiliary Feedwater Actuation Signal (AFAS) (Ref. 19, 20).

Feedwater supply for each TDAFW pump is from a Seismic Category 1, Condensate Storage Tank (CST). The Unit 1 CST is a nominal 250,000 gallon tank. The Unit 2 CST is a nominal 400,000 gallon tank. The tanks are discussed in greater detail at the end of this section. Individually, the CSTs provide sufficient inventory to meet Phase 1 requirements (Unit 1, 16 hours; Unit 2, 43 hours).

The qualified inventory of the two CSTs (581,600 gallons) will be shared between the units to provide makeup flow to the steam generators for approximately 29 hours (Ref. 15). Crediting the CSTs for this amount of volume requires analysis and modifications. The following provides the basis for the volumes contained between the tank anti-vortex plate located 4" above the tank floor and a credited operating level.

- Unit 1 CST tank level is normally maintained just below the high-level alarm setpoint. Qualification of non-seismic condenser makeup nozzles (Ref. 33) in the upper region of the tank provides a nominal volume of 220,450 gallons (Ref. 68) based on a tank water elevation of 24'-5" located between CST low-level (20'-0") and high-level (27'-10") alarms (Ref. 59).
- The Unit 2 CST tank level is normally maintained just below the high-level alarm setpoint. Qualification of the non-seismic nozzles (Ref. 28, 26, 27) provides a nominal volume of 361,150 gallons (Ref. 69) based on a tank water elevation of 38'-9" located between the CST low-level (33'-0") and high-level (44'-6") alarms (Ref. 60).
- Seismic qualification of the missile protected CST cross-tie line allows the contents of the larger Unit 2 CST to be shared with Unit 1 providing a shared volume of 581,600 gallons.
- The Unit 2 CST is seismically qualified and missile protected.
- The Unit 1 CST is seismically qualified. An engineering evaluation will be performed to qualify the CST for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update. Pending Action 13

The qualified inventory of at least one RWT will be shared as required between the units. The basis for crediting the RWT(s) is as follows:

- The RWT for each unit contains a minimum 477,360 gallons of borated water per Technical Specifications (Ref. 1, T.S. 3.5.4).
- Both RWTs are seismically qualified; but are not currently qualified for design basis tornados. The RWTs are not currently cross-connected.
- An engineering evaluation will be performed to qualify the RWT(s) for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update. Pending Action 14
- The evaluation may include other water sources such as the CWSTs, TWST, and PWSTs.
- If required by the above evaluation, the RWTs will be cross-connected with a missile protected line to allow either RWT to be aligned for gravity flow to the SDC piping of either unit. Pending Action 65

FLEX equipment will be deployed during the Phase 1 period in support of the Phase 2 Coping Strategy for Modes 1 through 4, and Mode 5 with Steam Generators Available.

- A 480 VAC FLEX diesel generator will be deployed within 6 - 8 hours to supply power to the battery chargers and other selected equipment to support FLEX strategies.

- A CST FLEX pump will be deployed at 15 - 17 hours to provide a source of makeup water from the Refueling Water Storage Tank (RWT) or other available source.
- A SG FLEX pump will be deployed within 10-12 hours to provide a source of water from the CST to the SGs in the event the TDAFW pump fails.

The ability to deploy the FLEX equipment within prescribed times and available on-site resources will be time validated for steam generator makeup. Pending Action 31, 34, 35

Phase 1 Coping Strategy *(Modes 5 and 6 without Steam Generators Available)*

ELAP/LUHS response actions for Modes 5 and 6 without steam generators available focus on protecting the first fission product barrier – the fuel cladding. Without steam generators available for removal of decay heat, once through cooling will be employed to transfer core decay heat to the containment. Without containment heat removal systems available, the containment must be vented.

The NEI 12-06 strategy (Ref. **46**, Table 3-2) is to provide borated RCS makeup. The Phase 1 strategy is to provide gravity feed from the RWT with transition in Phase 2 to pumped feed via the portable SG FLEX pump.

Multiple plant system configurations may exist following an ELAP/LUHS event (Ref. 53, 54, 55). These are reviewed to identify requirements for coping strategies to protect the fuel cladding.

Case	System/Equipment Configuration	Gravity Feed	Review / Comments
A	RCS Solid, PZR Manway On, RCS Depressurized	No	Once Through Cooling through PORVs (SGs may also be available)
B	PZR Level 30% WR preparing for PZR Manway Removal, RCS Depressurized	No	Once Through Cooling through PORVs Time Critical Action: Establish Phase 2 RWT Pumped Feed (SGs may also be available)
C	Reduced Inventory, PZR Manway Off, Preparing for RX Head Removal	Yes	Once Through Cooling through PZR Manway. RCS vent established
D	Mid-Loop Operation, PZR Manway Off, Preparing for SG Nozzle Dam Installation	Yes	Once Through Cooling through PZR Manway. Time Critical Action: Establish RWT Gravity Feed in Phase 1
E	RX Head Off, Prior to Flooding Reactor Cavity	Yes	Once Through Cooling through RX vessel. Greater RCS inventory than mid-loop operation.
F	Refueling Cavity Full, RX Head Off, Transferring Fuel	Not Required	Once Through Cooling through RX vessel. Time critical action: Isolate fuel transfer tube path to separate RCB/SFP environments

Each RWT contains a borated water inventory of 477,360 gallons (Ref. 1, T.S. 3.5.4). When Mode 5 is entered the RWT remains at approximately this level until the RWT water is transferred to the reactor refueling cavity for refueling operations. For cases C, D & E, gravity feed can be established from the RWT via the LPSI pump suction path by manual valve operation. Gravity feeding the RCS is currently described in plant procedure 1/2-ONP-01.05. (Ref. 55).

For core cooling and containment essential functions for Mode 6 & 5 without SGs available, the reactor is assumed to have been shut down for 72 hours following a full operating cycle. This represents the approximate minimum time required to shut down the plant for normal offload of spent fuel with the SGs being isolated for planned maintenance. Makeup requirements at this time frame are approximately 71 gpm (Ref. 15). Gravity feed rates from the RWT through the LPSI pump exceed this makeup requirement with as little as a 1 foot water level difference between the RWT and RCS (Ref. 16). RWT TS water levels provide a >20 feet level difference and will support gravity feed for extended periods with a vented containment. Check valves in the supply paths prevent reverse flow from the RCS to the RWT.

Case D, mid-loop condition, has the least RCS water mass and presents the bounding time constraint for initiation of Phase 1 gravity flow. The time from a 100 °F inventory condition to core boiling is 14 minutes and the additional time to core uncovery is 114 minutes for EPU conditions (Ref. 40, 41). For all cases, initiation of Phase 1 RWT gravity flow within 1 hour is a conservative time requirement to prevent core uncovery. At mid-loop conditions, this is a time critical requirement that does not afford a 2 hour margin.

Case A, PZR Manway On, RCS Solid results in rapid pressurization following loss of AC power. This case will result in lifting of system relief valves and will gradually transition to Case B.

Case B, Pressurizer (PZR) Level 30% Wide Range (WR) with PZR Manway On is a case entered in preparation for manway removal to provide a vent path. This case couples limited PZR volume with steam release through the PORVs. As gravity flow from the RWT will be prevented by PZR pressurization, this case presents a time constraint for initiation of Phase 2 pumped flow. The RCS volume between 30% PZR WR level and mid-loop (41,235 gallons, Ref. 57) provides a coping time of approximately 10 hours at the 71 gpm boil off rate. This is a conservative value as it does not consider time-to-boil for the RCS volume nor the occurrence of heat transfer to the secondary side of the vented, but filled, steam generators. For all cases with a vented containment, staging of the SG FLEX pump within 8 hours for RCS injection from the RWT is a conservative time requirement.

The Unit 1 and 2 PORVs are pilot operated valves controlled by DC powered solenoid valves. The solenoid power is fed from safety related buses which are not shed during the FLEX strategy (Ref. 8, 9). Accordingly, both PORVs will remain available provided DC power is maintained. Plant procedures (Ref. 53) provide instructions on the method to open the PORVs to establish once through cooling.

The Unit 1 PORV size is smaller and limiting. The pressure within the Pressurizer for the 71 gpm boil off rate is 291 psia assuming one PORV has been opened (Ref. 17). FLEX scenarios do not assume equipment failures; with both PORVs available, the PZR pressure will be considerably lower. The SG FLEX pump sizing provides adequate makeup flow to the RCS this case (Ref. 5).

The above cases were reviewed assuming RWT gravity flow would not be adversely affected by containment pressurization. Case B identified an approximate 10 hour coping time for deployment of the SG FLEX pump as no gravity flow would occur due to pressurization of the PZR (flow through a PORV). The timing for SG FLEX pump deployment was identified as bounding for all cases with a vented containment. However, containment pressurization must be considered.

Review of the Case D (mid-loop condition) gravity flow capability indicates insufficient makeup flow is provided for a backpressure above 9.2 psig (Ref. 16). Accounting for a 1 psig pressure drop through the open PZR manway, containment pressurization above 8.2 psig will result in insufficient makeup flow to prevent RCS level dropping below mid-loop. A closed containment (with once-through-cooling and no heat removal) will slowly pressurize to 8.2 psig within 4 hours (Ref. 7) once core boiling has initiated. However, venting containment through an 8" or larger opening within 1 hour will prevent containment pressure rising above 4.7 psig (Ref. 7).

For the mid-loop condition, the RWT gravity feed path will be alligned and the containment vented within a 1 hour timeframe. With these actions, sufficient gravity flow is provided. For all cases, SG FLEX pump deployment within 10 hours provides a suitable Phase 2 success path.

The above review indicates the Phase 1 strategy will prevent core uncovery and a Phase 2 pumped flow strategy is required within a 10 hour timeframe.

This strategy is dependent upon providing a qualified borated water source. Currently, the RWTs are Seismic Category 1 components but are not qualified for tornado wind hazards. An Engineering analysis will be performed to qualify the RWTs for tornado wind hazards or plant modifications will be performed as required. Pending Action 14

FLEX equipment will be deployed during the Phase 1 period in support of the Phase 2 Coping Strategy for Modes 5 and 6 without Steam Generators Available.

- A 480 VAC FLEX diesel generator will be deployed 6 - 8 hours into the event to supply power to the battery chargers and other selected equipment to support FLEX strategies.
- A SG FLEX pump will be deployed 6 - 8 hours into the event to provide a pumped source of injection water from the RWT to the RCS via FLEX connections downstream of the LPSI pumps.

The ability to deploy the FLEX equipment within prescribed times and available on-site resources for RCS makeup will be time validated. Pending Action 31, 39

Details

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

Existing plant procedures:

- 0005753, Severe Weather Preparations – provides guidance on unit shutdown based on hurricane severity
- EPIP-02, Duties and Responsibilities of the Emergency Coordinator - provides guidance on unit shutdown based on hurricane severity
- EOP-1, Standard Post Trip Actions – provides actions to verify proper response of systems following an automatic or manual reactor trip. Plant conditions are assessed to determine the appropriate recovery procedure
- EOP-10, Station Blackout – provides actions to respond to loss of all AC power.
- EOP-99, Appendices / Figures / Tables / Data Sheets – provides guidance for various plant activities (e.g. DC Bus Load Shedding, Local operation of TDAFW, etc.)
- NOP-01.04, RCS Reduced Inventory and Mid-Loop Operation

- ONP-01.03, Plant Condition 3 Shutdown Cooling In Operation - No Reduced Inventory
- ONP-01.04, Plant Condition 3 Shutdown Cooling In Operation - Reduced Inventory
- ONP-01.05, Plant Condition 5 SDC System in Operation – Reactor Head Removed

To be developed:

PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing strategies within existing plant procedures.

- FSG for deployment and installation of CST FLEX pump
- FSG for deployment and installation of SG FLEX pump
- FSG for deployment and installation of 480 VAC FLEX diesel generator
- FSG for extended DC bus load shedding or revision to EOP-99
- FSG for maintaining flow to SGs, with identified backup sources and criteria for transferring between sources
- FSG for establishing RWT gravity flow to RCS and criteria for transferring to SG FLEX pump

List modifications and describe how they support coping time.

- Unit 1 – Modify two ADVs with a pneumatic connection to allow local operation. Seismically mount N2 bottles with hose connections in the Unit 1 steam trestle. The bottles will be sized for 120 hours of operation. Installation of a seismic installed nitrogen. Allows ADV use under BDBEE conditions when instrument air would not be available. Figure 10.
- Unit 1 - An engineering evaluation will be performed to qualify the CST for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update.
- Unit 1 & 2 - Seismically qualify the condenser makeup lines for both CSTs. This provides approximately 110,000 gallons additional water inventory for hot standby and cooldown.
- Unit 1 & 2 – Seismically qualify CST Cross-tie line. This modification allows larger Unit 2 CST inventory to be shared between units and extends time frame required for Unit 1 CST FLEX pump deployment.
- Unit 1 & 2 - An engineering evaluation will be performed to qualify the RWT(s) for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update. The analysis will provide a qualified borated water source of 477,360 gallons for BDBEE high wind hazard events.
- Unit 1 & 2 - The engineering evaluation may include other water sources such as the CWSTs, TWST, and PWSTs. Any required plant modifications will be implemented as appropriate with information provided in the six month update. The analysis will provide additional qualified water sources for use in BDBEE high wind hazard events
- Unit 1 & 2 - If required by the above evaluation, the RWTs will be cross-connected with a seismically qualified, missile protected line to allow either RWT to be aligned for gravity flow to the SDC piping of either unit. This modification allows either RWT to be aligned for gravity flow to the SDC piping of either unit.

List instrumentation credited for this coping evaluation phase.

- RCS T hot – T-1111X, T-1121X
- RCS WR T cold – T-1115, T-1125
- AFW Pump Flow – F-09-2C
- SG Pressure – P-8013A, P-8023A
- SG Level - L-9012, L-9022
- Unit 1 CST Level – L-12-11, L-12-12
- Unit 2 CST Level – L-12-11A, L-12-11B
- DC Bus Voltage

The following additional instrument loops are available to assist monitoring plant parameters:

- RCS Wide Range Pressure - P-1107, P-1108
- Source Range Neutron Flux - R-26-80A4, R-26-80B4
- Containment Pressure - P-07-4A(Unit 1), P-07-4A (Unit 2)
- SIT Levels - L-3311, 3321, 3331, 3341 (Unit 1), L-3312, 3322, 3332, 3342 (Unit 2)
- Pressurizer Level - L-1110X, L-1110Y
- Containment Temperature - T-07-3A (Unit 1), T-07-3A (Unit 2)

Notes: References: See Attachment 4. Acronyms: See Attachment 5.

Maintain Core Cooling & Heat Removal

PWR Portable Equipment Phase 2

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

Phase 2 Coping Strategy ***(Modes 1 through 4, and Mode 5 with Steam Generators Available)***

RCS core cooling and heat removal will be maintained while performing a cooldown and depressurization of the RCS. Several actions are required during Phase 2 for reactor core cooling. The main strategy is dependent upon the continual operation of the TDAFW pump, which is capable of feeding the steam generators provided there is an ample steam supply to drive the TDAFW pump turbines.

As a baseline capability for reactor core cooling for Phase 2 a portable diesel driven pump (SG FLEX pump) will be deployed for injection into the steam generators in the event that the TDAFW pump fails. Implementing this capability requires depressurizing the steam generators to allow for makeup with the SG FLEX pump. To allow for defense-in-depth actions in the event of an unforeseen failure of the TDAFW pump, the portable SG FLEX pump for the Phase 2 core cooling will be staged and made ready as resources are available following the BDBEE event. The SG FLEX Pump will be staged at a location near the CST. The supply for the SG FLEX pump will be the CSTs. Modifications will provide connection points for connection of the SG FLEX pump to the CST (Figure 4). Time and resources necessary to make the SG FLEX pump available for use will be validated. Pending Action 35

At 10 hours following the event, the flow rate required to remove decay heat is approximately 118 gpm prior to cooldown and depressurization of the steam generators. (Ref. 15) Depressurization of the steam generators will be achieved by deploying field operators to complete this activity locally for Unit 1. The RCS cooldown rate will be approximately 75°F/hr. via the ADVs to a SG pressure of approximately 120 psia. (Ref. 46) TDAFW pump flow will be increased to approximately 480 gpm between hours 10 and 14 for the cooldown (Ref. 15).

At 120 psia , the ADVs are throttled to stabilize steam generator pressure and prevent adverse impact to the TDAFW pump operation. At a steam generator pressure of 120 psia, the RCS temperature and pressure are expected to decrease to below 350°F and 150 psia. (Ref. 70, Section 5.5.2)

Phase 2 Coping Strategy ***(Modes 5 and 6 without Steam Generators Available)***

The primary strategy for RCS core cooling without the steam generators available is to utilize the SG FLEX pump for RCS injection. The SG FLEX pump will be aligned to take suction from the RWT(s) and discharge to connections downstream of the LPSI pumps that discharge to the RCS cold legs. The LPSI pump piping will be modified to provide connections (Figure 14). Time and resources necessary to deploy and stage this equipment will be validated. Pending Action 39

The makeup injection strategy will include periods of overfeed to mitigate boric acid concentration and precipitation issues. As the RWT inventory is depleted, makeup water will be pumped from other potential sources to the RWT. Makeup water will be borated prior to use.

The boric acid batching tank, located within each RAB, (or portable FLEX boration equipment) will be used for this purpose. Water from the CST or other available source can be borated in the batching tank and gravity drained to the makeup tanks for blending with demineralized water. A boric acid makeup pump (143 gpm, 231 ft TDH) (Ref. 2, Section 9.3) can pump the borated water to the RWT for subsequent injection into the RCS by the FLEX SG Pump. The modifications required to deploy this approach require further review to determine whether FLEX boration equipment may be a more viable approach. This determination will be made and time and resources necessary to deploy and stage the selected equipment will be validated. Pending Action 15, 40

The above described boration plan proposes use of each unit's Boric Acid Batching Tank (missile protected, non-seismic). For a seismic event, use of the batching tank will not be required as both RWTs (954,720 gallons) will be available. For the required makeup water flow (72 gpm, (Ref. 15) and a nominal 120 hour Phase 1-2 period, the total volume injected (518,400 gallons) will not result in containment water levels beyond those considered for design basis accidents.

Phase 2 Coping Strategy *(Water Sources for SG and RCS Injection)*:

Seismic Event
For a seismic event, the full volumes of the CSTs and RWTs in both units are assumed available based on the modifications to address Unit 1 CST non-seismic interface piping discussed in Phase 1. The combined inventory of these four tanks is 1536320 gallons (954,720 gallons borated, 581,600 gallons unborated. The combined inventory provides a Phase 1&2 coping period of >120 hours for all modes. The review for the seismic event also applies to flooding and extreme temperature events.

High Wind Event
For a high wind event, the volume of one RWT is assumed available. The full volumes of the CSTs and one RWT is assumed available based on the modifications to address Unit 1 CST non-seismic interface piping and the CST/RWT analyses discussed in Phase 1. The combined inventory of these three tanks is 1,058,960 gallons (477,360 gallons borated, 581,600 gallons unborated. The combined inventory provides a Phase 1&2 coping period of that is influenced by the operating modes of the units at the time of the event.

If both units are in operating modes with steam generators available, the inventory in the surviving RWT, that is not be required for eventual RCS makeup, will be added to the cross-connected CSTs (approximately an additional 440,000 gallons). This extends the total steam generator feed inventory to 1,021,600 gallons (510,800 gallons per Unit) or to approximately 76 hours (Ref. 15, 36).

Should the refueling cavity of one unit be filled, the majority of its RWT volume will not be available for use in the other unit for core cooling. In this case, the contents of the non-operating unit's CST is available for makeup to the steam generator of the operating unit. The combined CST volumes of 581,600 gallons support a coping time of approximately 94 hours.

RRC equipment in support of the Phase 3 strategy to initiate SDC will arrive at the RRC staging area after 72 hours. The timeframe to deploy this offsite equipment and enter SDC is envisioned to require36-48 hours resulting in a total Phase 2 coping time of approximately 120 hours. Therefore, in a wind-based event, an additional volume of water is required before the long term strategy for SDC initiation is available. Additionally, a boration capability will be required.

As qualified water sources are depleted, makeup water will be pumped to the CST/RWT from the potential sources listed in the table below with the CST FLEX Pump. Based on the number and dispersed location of these tanks, it is highly likely that large volumes of on-site water will be available following a BDBEE wind-based event. Each of these site tanks will be modified to allow FLEX pumps to take suction from them. As a last resort, seawater will be used for SG and RCS cooling.

Rank	Volume (gal)	Source	Seismic	Missile protected	Water Quality
1	199,000	Treated Water Storage Tank	N	N	Demin
2	150,000 (U1) 150,000 (U2)	Primary Water Tank	N	N	Demin
3	120,000	Monitor Storage Tank 12C	N	N	Borated Or Demin
4	351,000 1A 351,000 1B	City Water Storage Tanks	N	N	Potable
5	Unlimited	Ft. Pierce Utilities Supply Line	N	N	Potable
6	10,000 gal/truck	Tanker Trucks from Offsite*	N	N	Potable or Demin
7	~ 3,000,000	Retention Ponds	N	N/A	Brackish
8	Unlimited	Intake Canal	Y	Y	Seawater

* Contract or letter of agreement required to credit this source. Pending Action 19

Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* • EOP-10, Station Blackout – provides actions to respond to loss of all AC power. • EOP-99, Appendices / Figures / Tables / Data Sheets - provides guidance for numerous activities such as DC bus shedding, local operation of the ADVs, etc. PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing

	command and control strategies within existing plant procedures. To be developed: • Revision to EOP-10 or FSG for additional guidance for cooldown of RCS • FSG for deployment and operation of SG FLEX pump • FSG for deployment and operation of CST FLEX pump • FSG for deployment and operation of 480 VAC FLEX Generator • FSG for refueling diesel power FLEX equipment • FSG guidance for boron mixing • FSG guidance for delivery of water via tanker trucks
Identify modifications	*List modifications necessary for phase 2* • Unit 1 & 2 – Qualified and diverse connections to the CSTs to supply water to the suction of the SG FLEX pump. This modification ensures a source of water is available to feed the SGs via the SG FLEX pump in the event of failure or inadequate steam supply to the TDAFW pump. Figure 11 • Unit 1 & 2 – Provide qualified and diverse connections to the CST for CST fill from designated source. This modification provides a means to fill the CSTs on low inventory from any survivable water source via the CST FLEX pump. Figure 12 • Unit 1 – An engineering evaluation will be performed to qualify the CST for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update. This will ensure that the contents of the CST are available to support hot standby and cooldown conditions • Unit 1 & 2 – Seismically qualify the cross connect line between the CSTs. This modification increases the flexibility for water usage between the units • Unit 1 & 2 – Seismically qualify the condenser makeup lines penetrating the CSTs. This modification will provide additional water for hot standby and cooldown • Unit 1 & 2 – Install flanged connections and isolation valves on AFW lines downstream of MV-09-11 and MV-09-12. Provides a location for SG FLEX pump to discharge to the SGs. Figure 13 • Unit 1 & 2 – Modify 480 VAC switchgear to accept tie in of 480 VAC FLEX diesel generator. This modification will allow re-powering of the station battery chargers and other specified equipment to support Phase 2 strategy • Unit 1 & 2 - An engineering evaluation will be performed to qualify the RWT(s) for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update. This will ensure a qualified borated water source of 477,360 gallons for

	BDBEE high wind hazard events. • Unit 1 & 2 - The engineering evaluation may include other water sources such as the CWSTs, TWST, and PWSTs. Any required plant modifications will be implemented as appropriate with information provided in the six month update. The analysis will provide additional qualified water sources for use in BDBEE high wind hazard events • Unit 1 & 2 - If required by the above evaluation, the RWTs will be cross-connected with a seismically qualified, missile protected line to allow either RWT to be aligned for gravity flow to the SDC piping of either unit. This modification allows either RWT to be aligned for gravity flow to the SDC piping of either unit. • Unit 1 & 2 – Install flanged connections and isolation valves on LPSI Pump Discharge and Suction for discharge of SG FLEX Pump. Figure 14, Figure 15 • Unit 1 & 2 – Install flanged connections and isolation valves to allow FLEX pumps to draw water from non-qualified water sources. Figure 19 (CWST/ Ft. Pierce Utilities Water Supply, Figure 20 (TWST), Figure 21 (PWST)
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* • RCS WR T hot – Core Exit Thermocouple • RCS WR T cold – T-1115, T-1125 • AFW Pump Flow – F-09-2C • SG Pressure – P-8013A, P-8023A • Unit 1 CST Level – L-12-11, L-12-12 • Unit 2 CST Level – L-12-11A, L-12-11B • DC Bus Voltage • Safety Injection Tank Level o Unit 1 – L-3311, L-3321, L-3331, L-3341 o Unit 2 – L-3312, L-3322, L-3332, L-3342 • Core Exit Thermocouples • Reactor Vessel Level – Qualified Safety Parameter Display System • Pressurizer Pressure (WR) – P-1107, P-1108 • Reactor Power Level – Source Range – R-26-80A4, R-26-80B4 • Pressurizer Level - L-1110X, L-1110Y Note: More instruments will be restored following connection of the 480 VAC FLEX generator to the 480 VAC switchgear and restoration of selected breakers that were opened during DC load shedding.

Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* The FLEX equipment storage building (FESB) will be a single building capable of housing all FLEX equipment required to meet FLEX strategies. There will be sufficient equipment to address all functions for both units, plus one additional spare, i.e., an N+1 capability, where "N" is the number of units or 2N, where each piece of equipment is rated at 200% capacity and capable of supporting both units. FLEX equipment shall be protected and meet the requirements provided in NEI 12-06. Equipment stored in the FLEX storage building will be evaluated and protected from seismic events and a Safe Shutdown Earthquake. FLEX equipment, including the tow vehicles and debris removal equipment, will be located inside of the FLEX storage building and secured for a Safe Shutdown Earthquake, as required.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect* FLEX equipment will be stored above flood waters. The lowest deployment paths from the FESB are above an elevation of 12 feet MLW (Ref. 67). The flood surge resulting in a Probable Maximum Flood (PMF) is anticipated to exceed an elevation of 12 ft for 2 hrs duration (Ref. 2, Unit 2, Figure 2.4-12). Based on the coping milestone timelines in Attachment 1A, access to Phase 2 FLEX equipment will not be required until flood waters have receded.
Severe Storms with High Winds	*List Protection or schedule to protect* FESB will be designed to survive PSL design basis hurricanes, tornados and tornado missiles. Hurricanes will have advance notice and the units will be placed in a safe condition per plant procedures (Ref. 48). Time critical FLEX equipment responses can be prestaged in robust structures, as required, before the onset of hurricane winds. Other BDBEE high wind events (tornado) are short lived and are not anticipated to present FLEX equipment access issues.
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* The guidelines provided in NEI 12-06 (Section 8.2.1) exclude the need to consider extreme snowfall at plant sites in the southeastern U.S. below the 35th parallel. The PSL plant site is located at approximately 27° north latitude (Ref. 2, Section 2.1.1) and thus the capability to address impedances caused by extreme snowfall with snow removal equipment need not be provided.
High Temperatures	*List Protection or schedule to protect* The climate at PSL is typical of that in southern Florida, being hot and humid in the summer and mild in the winter. The PSL site

	(Hutchinson Island) average maximum temperature ranges from 72° F in February to 87° F in August. An extreme maximum of 101°F was recorded in July 1942. (Ref. 2, UFSAR Unit 2, Table 2.3-37) FLEX equipment (i.e., pumps, diesel generators, etc.) shall be capable of operating in hot weather in excess of the site extreme maximum of 101°F which is below the threshold of 110° F discussed in NEI 12-06. It is not expected that FLEX equipment and deployment would be affected by high temperatures. Nonetheless, temperature considerations will be made with respect to procuring and maintaining equipment within design ratings and for personnel habitability. Storage of FLEX equipment in the FESB will include natural ventilation to maintain temperatures within the manufacturer's recommendations.

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. Equipment used in Phase 2 is pre-staged in Phase 1: CST FLEX Pump SG FLEX Pump 480 VAC FLEX Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	*Identify modifications* • Unit 1 & 2 – Provide qualified and diverse connections to CSTs to supply water to suction of SG FLEX pump. Figure 11 • Unit 1 & 2 – Provide qualified and diverse connections to CSTs for CST fill from designated source. Figure 12 • Unit 1 – An engineering evaluation will be performed to qualify the CST for BDBEE high wind hazards. • Unit 1 & 2 – Seismically qualify the cross connect line between CSTs. • Unit 1 & 2 – Seismically qualify the condenser makeup lines penetrating the CSTs. • Unit 1 & 2 – Install flanged connections and isolation valves on AFW lines downstream of MV-09-11 and MV-09-12. Figure 13 • Unit 1 & 2 – Modify 480 VAC switchgear to tie 480 VAC FLEX diesel generator. Figure 1, Figure 2	*Identify how the connection is protected* All connections for the FLEX equipment will be designed to withstand and be protected from site applicable hazards.

	• Unit 1 & 2 - An engineering evaluation will be performed to qualify the RWT(s) for BDBEE high wind hazards. Any required plant modifications will be implemented as appropriate with information provided in the six month update. • Unit 1 & 2 - The engineering evaluation may include other water sources such as the CWSTs, TWST, and PWSTs. Any required plant modifications will be implemented as appropriate with information provided in the six month update. • Unit 1 & 2 - If required by the above evaluation, the RWTs will be cross-connected with a seismically qualified, missile protected line to allow either RWT to be aligned for gravity flow to the SDC piping of either unit. • Unit 1 & 2 – Install flanged connections and isolation valves on LPSI Pump Discharge and Suction for discharge of SG FLEX Pump. Figure 14, Figure 15 • Unit 1 & 2 – Install flanged connections and isolation valves for FLEX pumps to draw water from non-qualified water sources. Figure 19 CWST/FPU Supply Figure 20 TWST Figure 21 PWST	
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain Core Cooling & Heat Removal

PWR Portable Equipment Phase 3

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods and strategy(ies) utilized to achieve this coping time.

Phase 3 strategies for all modes of RCS cooling will be to establish Shutdown Cooling (SDC) which will require an RRC pumping system capable of cooling the SDC Heat Exchanger and a RRC 4.16 KVAC diesel generator to power Component Cooling Water (CCW) and Low Pressure Safety Injection (LPSI) pumps.

The offsite pumping system will provide a minimum of 7,162 gpm per unit based on the cooling requirements of the CCW heat exchanger some days after a Reactor trip (Ref. 18). Evaluation of the RRC LUHS Pumping System sizing and equipment availability is required. Pending Action 23

The Ultimate Heat Sink (UHS) dam valves are capable of being opened to supply backup flow from Big Mud Creek (Intracoastal Waterway) to the intake canal. Suction of the offsite pumping system will be from the Intake and will discharge to new connections located at the intake structure on ICW system piping lines. Two new connection points with isolation valves will be provided. It is anticipated that a manifold may be required to interface with multiple hoses from an RRC LUHS Pumping System. Figure 17, Figure 18

The seawater source in a maximum probable hurricane event will contain floating and submerged debris which may adversely affect the use of the RRC LUHS Pumping System and CCW heat exchangers. Accordingly, for such an event, the suction of the RRC LUHS pumping system will be preferentially placed within the plant intake wells to provide straining by the intake traveling water screens. The traveling water screens are provided for the combined circulating water and intake cooling water system flow rates. While these screens are not seismically designed, they are ruggedly designed to accommodate large in-service hydraulic loads (a seismic event is not expected to create a debris issue). Due to their large surface area, the screens will be effective in straining the intake flow without the need to power the traveling screens. In addition to these screens, the CCW heat exchangers are equipped with full flow automatic debris filters. While the debris filters are capable of manual backwash operation, the filters will be provided with power from the 4.16 KVAC RRC FLEX generator so they may operate in their automatic mode.

The RRC 4.16 KVAC diesel generator will re-power several loads in support of Shutdown Cooling Figure 1, Figure 2 & Figure 6. One low pressure safety injection (LPSI) pump will be re-powered to establish RCS recirculation. Heat removal will be through the SDC heat exchangers which are cooled by establishing flow through the CCW system by re-powering one of the CCW pumps.

Figure 6 shows contingency connections on the suction side of the LPSI pumps. Should RCS level not be able to be raised, these connections would support SDC initiation by providing a number of potential methods to mitigate LPSI pump NPSH issues. One method, the use of a portable pump with a cooled suction is shown.

Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Existing: • 1 (2) –NOP-03.05, Shutdown Cooling PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG – Tie-in of RRC 4.16 KVAC generator • FSG – Tie-in and operation of RRC pumping system for ICW • FSG – Re-establish UHS with RRC LUHS Pumping System
Identify modifications	*List modifications necessary for phase 3* • Unit 1 & 2 – Tie-in connections for RRC 4.16 KVAC generator. This modification will allow re-powering major loads to establish long term cooling to the RCS. Figure 1, Figure 2 • Unit 1 & 2 – Install connections and valves for RRC pumping system for ICW. This modification will reestablish the UHS in support of long term RCS cooling. Figure 17, Figure 18 • Unit 1 & 2 – Install connections with isolation valves on the inlet of each LPSI pump. This modification allows SG FLEX pump to inject cold borated water into the LPSI pump suction line should RCS water level not be able to be raised to provide NPSH requirements. Figure 15
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* • RCS WR T hot – Core Exit Thermocouple • RCS WR T cold – T-1115, T-1125 • RCS Wide Range Pressure – P-1107, P-1108

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 to be deployed during Phase 3: RRC LUHS Pump System RRC 4.16 KVAC Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	Phase 3 plant modifications for RRC equipment deployment include: • Unit 1 & 2 – Tie-in connections for RRC 4.16 KVAC generator. Figure 1, Figure 2 • Unit 1 & 2 – Connections and valves for RRC pumping system for ICW. Figure 17, Figure 18 • Unit 1 & 2 – Install connections with isolation valves on the inlet of each LPSI pump. Figure 15	All connections for RRC FLEX equipment will be designed to withstand and be protected from the site applicable hazards.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain RCS Inventory Control

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

- **Low Leak RCP Seals or RCS makeup required**
- **All Plants Provide Means to Provide Borated RCS Makeup**

PWR Installed Equipment Phase 1

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time.

Phase 1 RCS Inventory Control Modes 1 – 5, Steam Generators Available

RCS makeup strategies for Mode 1 – 5 with steam generators are not required until Phase 2 or later (Ref. 36, Section 1.2.1). Boron injection is required during Phase 2 to provide cold shutdown margin (Ref. 13, 14).

The Phase 1 inventory control strategy is reliant upon the installation of low leakage Reactor Coolant Pump (RCP) seals, which minimizes RCS leakage and permits the start of cooldown and depressurization of the RCS to be delayed. RCS cooldown and depressurization will be delayed from the 2 hour recommendation of the WCAP-17601-P (Ref. 70, Section 5.5.2) to 10 hours into the event. This allows onsite staff prioritization on near term issues and for offsite personnel to arrive and assist with the evolution.

RCPs in both units are currently equipped with Flowserve N-9000 seals which provide an 8 hour coping time for station blackout conditions. Flowserve Abeyance seals will be added to the RCP seal packages to address potential N-9000 seal degradation in the extended loss of AC power event. Seal failure risk is very low in the 24 hour time period (Ref. 43). The Abeyance seal, which engages at a seal flow rate of 4.04 gpm to reduce the flow to near zero flow, will further lower risk (consequences) of a potential seal failure.

Phase 1 RCS Inventory Control Modes 5 and 6, Steam Generators Unavailable

RCS makeup strategies for Mode 6 and 5 without steam generators are addressed by the Core Cooling & Heat Removal strategy. The use of borated RWT water for RCS makeup in Modes 5 & 6 strategies adequately addresses cold shutdown requirements and will prevent any boron stratification concern. Further review is required to address the potential for boron precipitation during Phase 1&2 (pool boiling) and Phase 3 (cooldown to ambient temperature). Pending Action 18

[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* Existing: • EOP-10, Station Blackout PSL will use industry PWROG guidance to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG for cooldown of RCS during ELAP
Identify modifications	*List modifications* Unit 1 & 2 - Install RCP low leakage seals capable of providing negligible leakage during Phase 1 FLEX response. Installation of low leakage RCP seals will increase the time to core uncovery.
Key Reactor Parameters	*List instrumentation credited for this coping evaluation.* • Containment temperature - UR-07-2 Channel 1 (Unit 1) • Containment temperature - TI -07-3A (Unit 2) • Pressurizer Level – LI-1110X, LI-1110Y • RCS T hot – T-1111X, T-1121X • RCS WR T cold – TI-1115, TI-1125
Notes: References: See Attachment 4. Acronyms: See Attachment 5.	

Maintain RCS Inventory Control

PWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods(Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time.

Phase 2 RCS Inventory Control Modes 1 – 5, Steam Generators Available

Phase 2 strategy for RCS inventory control and long-term sub-criticality is to cooldown and depressurize the RCS per WCAP-17601 to a recommended steam generator pressure of 120 psia (Ref. 70, Section 5.5.2). The heat removed by depressurizing the steam generators cools the RCS to T_{avg} of approximately 350°F and a RCS pressure of 150 psia at saturation conditions (Ref. 70, Section 5.5.2). Cooldown will be performed in the 10-14 hour timeframe and the cooldown rate of 75 °F/hr will not be reduced to prevent head voiding.

During RCS depressurization, the safety injection tanks (SITs) will inject into the RCS due to shrinkage. Unit 2 SITs will inject at a nominal 625 psia and Unit 1 SITs will begin injecting at a nominal 250 psia. (Ref. 1; Ref. 70, Section 4.2.3.2.3). The amount of shrinkage and the expected RCS leakage can be accommodated by the available SIT volumes.

Once the FLEX 480 VAC diesel generator is operational (***8 hours), a charging pump (44 gpm) and the MOVs in the CVCS system will be re-powered (10 hours) to support inventory and reactivity control. For both St. Lucie Units at End of Cycle (EOC), additional boron from the BAM tanks may be required at a certain time based on the rate of cooldown and the initial boron in the RCS. Boration must begin prior to this to allow sufficient injection time (Ref. 13, 14).

Boration to achieve cold shutdown margin will be prioritized based on time validation studies and power availability (480VAC FLEX generator). A single Charging Pump is required to support this strategy. The boration requirement and timing will be addressed in the six month update. Pending Action 17

Should boron addition be required while in solid RCS conditions, the reactor head vent can be used for inventory release (normal letdown path is isolated by loss of power). The SIT injection path will not need to be isolated to prevent nitrogen injection into the RCS unless RCP seal failures occur. SIT level and/or pressure will be monitored to prevent nitrogen injection into the RCS. Once the Once the FLEX 480 VAC diesel generator is deployed, (6 - 8 hours) the SIT can be isolated by closing the discharge path MOVs.

Phase 2 RCS Inventory Control Modes 5 and 6, Steam Generators Unavailable

The primary Phase 2 strategy for maintaining core cooling without the steam generators available is to utilize the SG FLEX pump for injecting borated water into the RCS injection. The SG FLEX pump will be aligned to take suction from the RWT and discharge to connections downstream of the LPSI pumps that discharge to the RCS cold legs. LPSI pump piping will be modified to provide the connection for injection into the RCS. Figure 14

Details	
Provide brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Existing: • EOP-10, Station Blackout • EOP-99, Appendices / Figures / Tables / Data Sheets • 1(2)-NOP-100.04, Surveillance Requirements for Shutdown Margin, MODES 2,3,4 and 5 (Subcritical) PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG or revision to EOP-10 for cooldown guidance
Identify modifications	*List modifications* • Unit 1 & 2 – Install connection tie-in points for 480 VAC diesel generator (Figure 1, Figure 2). This modification will provide power to battery chargers, charging pump, and other selected loads. • Unit 1 & 2 - Provide hose connections and isolation valves on discharge pipe of LPSI pumps (Figure 14). This modification allows a method of injection inventory into the RCS.
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* • Safety Injection Tank Level - L-3311, 3321, 3331, 3341 (Unit 1), L-3312, 3322, 3332, 3342 (Unit 2) • Pressurizer Pressure – P-1107, P-1108 • Steam Generator Pressure – P-8013A, P-8023A • Reactor Vessel Level Indicating System • RCS WR T hot – Core Exit Thermocouple • RCS WR T cold – T-1115, T-1125 • Pressurizer Level – L-1110X, L-1110Y Note: Additional instruments will be restored following connection of the 480 FLEX generator to the 480 volt switchgear and restoration of selected breakers that were opened during DC load shedding.

Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* The FLEX equipment storage building (FESB) will be a single building capable of housing all FLEX equipment required to meet FLEX strategies. There will be sufficient equipment to address all functions for both units, plus one additional spare, i.e., an N+1 capability, where "N" is the number of units or 2N, where each piece of equipment is rated at 200% capacity and capable of supporting both units. FLEX equipment shall be protected and meet the requirements provided in NEI 12-06. Equipment stored in the FESB will be evaluated and protected from seismic events and a Safe Shutdown Earthquake. FLEX equipment, including the tow vehicles and debris removal equipment, will be located inside of the FLEX storage building and secured for a Safe Shutdown Earthquake, as required.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect* During a hurricane induced flooding event, access to areas in the plant, as well as access to the FESB, could be restricted due to flood waters and high winds. The strategy to maintain core cooling was developed such that access to Phase 2 FLEX equipment and access to environmentally harsh areas would not be required until the high winds had subsided and the flood waters receded.
Severe Storms with High Winds	*List Protection or schedule to protect* FESB will be designed to survive PSL design basis hurricanes, tornados and tornado missiles.
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* The guidelines provided in NEI 12-06 (Section 8.2.1) exclude the need to consider extreme snowfall at plant sites in the southeastern U.S. below the 35th parallel. The PSL plant site is located at approximately 27° north latitude (Ref. 2, Section 2.1.1) and thus the capability to address impedances caused by extreme snowfall with snow removal equipment need not be provided.
High Temperatures	*List Protection or schedule to protect* The climate at PSL is typical of that in southern Florida, being hot and humid in the summer and mild in the winter. The PSL site (Hutchinson Island) average maximum temperature ranges from 72° F in February to 87° F in August. An extreme maximum of 101°F was recorded in July 1942. (Ref. 2, UFSAR Unit 1, Table 2.3-10)

	FLEX equipment (i.e., pumps, diesel generators, etc.) shall be capable of operating in hot weather in excess of the site extreme maximum of 101°F which is below the threshold of 110° F discussed in NEI 12-06. (Ref. 46) It is not expected that FLEX equipment and deployment would be affected by high temperatures. Nonetheless, temperature considerations will be made with respect to procuring and maintaining equipment within design ratings and for personnel habitability. Storage of FLEX equipment in the FESB will include natural ventilation to maintain temperatures within the manufacturer's recommendations.	
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*
Equipment to be deployed during Phase 2: 480 VAC FLEX Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	• Unit 1 & 2 - Install connection tie-in points for 480 VAC FLEX Generator. Figure 1, Figure 2 • Unit 1 and 2 - Provide hose connections and isolation valves on suction and discharge pipe of LPSI pumps. Figure 14, Figure 15	All connections for the FLEX equipment will be designed to withstand and be protected from the site applicable hazards.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain RCS Inventory Control

PWR Portable Equipment Phase 3

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time.

Phase 3 RCS Inventory Control – All Modes

Phase 3 strategies for all modes of RCS cooling will be to establish Shutdown Cooling (SDC) operation. As described earlier, this requires an offsite pumping system from the RRC capable of removing heat from the reactor core and a large 4.16 KVAC diesel generator. The RRC equipment will allow ICW, CCW and SDC systems to be placed in service for eventual transition to core off load for inspection.

No specific phase 3 strategy is required for maintaining RCS inventory or sub-criticality.

If not already isolated, the Safety Injection Tanks (SITs) will be isolated. Normal plant procedures or new FSG procedures can be used for these actions.

Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Existing: • EOP-10, "Station Blackout" Safety Function Status Checks PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG guidance for SIT injection and isolation • FSG for damage assessment following event
Identify modifications	*List modifications* No additional modifications required.
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Pressurizer Level – L-1110X, L-1110Y Reactor Vessel Level Indication System Pressurizer Pressure - P-1107, P-1108 Cavity Level (Mode 5 and 6), - L-1117-1

Deployment Conceptual Modification **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Equipment to be deployed during Phase 3: None	No additional modifications required.	All connections for the FLEX equipment will be designed to withstand and be protected from the site applicable hazards.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain Containment

PWR Installed Equipment Phase 1

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

For scenarios with steam generators removing core heat, no specific coping strategy is required for maintaining containment integrity during Phase 1, 2 or 3. Review of once-through-cooling scenarios for Modes 6 & 5 without steam generators indicates containment venting will be required during Phase 2 to prevent exceeding containment design conditions.

Phase 1 Maintain Containment - Modes 1 - 5, Steam Generators Available

In these operating modes, the containment is normally isolated per plant technical specifications. Most containment isolation valves are normally closed or fail closed on loss of power. As the BDBEE event results in a loss of power and no valve failures are assumed (Ref. 46), the containment is assumed to be completely isolated following the event.

Steam generators will remove the majority of core decay heat from containment. Containment pressure and temperature will slowly rise due to RCS leakage and direct heat transfer. Heat loss from containment is not significant without operation of containment sprays or the cooling fan system. A MAAP analysis was conducted to determine the containment response with respect to design pressure (44 psig) and design temperature (264°F) (Ref. 2, Section 6.2)

Unit 1 containment MAAP analysis (Ref. 7) indicates containment pressure gradually increases and reaches 4.2 psig at 120 hours. The Unit 2 response is similar. The containment temperatures remained below 200F. For the Flowserve low-leakage Abeyance seals (Ref. 43), the analysis assumed a 5 gpm RCS inventory loss (1 gpm unidentified & 1 gpm/seal, Ref. 7). Containment integrity will be maintained for a minimum of 120 hours at which time containment cooling can be restored by repowering two containment fan coolers (CFC) cooled by CCW and the RRC LUHS Pumping System. Equipment qualification (EQ) limits for safety related equipment will not be challenged by the expected containment conditions.

A potential issue with high containment temperatures in ELAP conditions is steam generation within the cooling water circuit of a containment fan cooler (CFC). As addressed in NRC GL 96-06, steam generation is adverse as it can lead to waterhammer events on reinitiating cooling water system flow. For the assumed 1 gpm/seal leakage rate, the containment temperature (<200F) will not lead to steam generation within the water circuit.

No specific coping strategies are required for maintaining containment integrity during Phase 1. The only action necessary is to monitor containment pressure and temperature to verify that RCS leakage is minimal. Containment conditions are monitored during performance of Safety Function Status Checks of EOP-10. Containment pressure and temperature will be available via normal plant instrumentation.

[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.

Phase 1 Maintain Containment - Modes 6 & 5 Without Steam Generators Available

In these modes, plant Technical Specifications do not require containment integrity, other than the containment closure capability addressed within TS LCO 3.9.4. (Ref. 1). Without containment heat removal systems available, containment pressure and temperature cannot be controlled.

Containment MAAP analysis (Ref. 7) indicates containment conditions after approximately 33 hours challenge containment design conditions (44 psig/264 °F). For a closed containment, venting to preclude challenging containment design parameters is required in Phase 2. However, the Phase 1 strategy to Maintain Core Cooling using gravity flow from the RWT introduces another restriction on containment pressurization.

For the mid-loop condition, insufficient makeup flow is provided for a containment pressure above 8.2 psig (See Maintain Core Cooling response). For a closed containment, the MAAP analysis (Ref. 7) indicates that, from the onset of boiling, a closed containment will pressurize to 8.2 psig within 4 hours (Ref. 7). However, venting containment through an 8" vent line at one hour maintains the pressure below 5 psig.

For mode 6 & 5 without steam generators, containment will be vented within 1 hour via a minimum 8" vent path to ensure sufficient gravity flow for RCS makeup. Figure 22 shows a proposed approach (alternate approaches: open a containment air lock or main purge valve). Unit 2 has an 8" mini-purge line which will be evaluated for this use. Pending Action 20

The fuel transfer tube path between containment and the spent fuel pit, if open, will be closed to separate the two areas and prevent introduction of unborated seawater into the refueling cavity from the SFP. Closure of the fuel transfer tube path is accomplished either by installation of the transfer tube blind flange located within containment or closure of V4111, Isolation Valve For Fuel Transfer Tube Penetration (P-25), located within the Fuel Handling Building. Closure by one method will be performed before habitability issues prevent access to both areas.

A potential issue with high containment temperatures in ELAP conditions is steam generation within the cooling water circuit of containment fan coolers (CFC) as well as other coolers. As addressed in NRC GL 96-06, steam generation is adverse as it can lead to waterhammer events on reinitiating cooling water system flow. In the Mode 5 & 6 once-through-cooling scenario, containment temperature will exceed 200 °F in 8 hours. Isolation of the cooling water circuits within containment (RCB penetrations P-15 though P-24) will be performed at 4 - 6 hours to prevent issues in Phase 3 with subsequent initiation of shutdown cooling. The isolated cooling water circuits are provided with relief valves to prevent overpressurization of the isolated closed loop.

Core damage is not expected for the Mode 6 and 5 scenarios without steam generators. The acceptability of venting containment in Mode 6 & 5 is viewed in terms of a beyond design basis scenario and the acceptability under the same scenario for spent fuel pool boiling with a direct release to atmosphere. The situation within containment is similar to that of the spent fuel pool with a full core offload. Within containment, condensation on equipment and containment surfaces will provide a partitioning effect to trap radionuclides.

	Details
Provide a brief description of Procedures / Strategies / Guidelines	Existing: • EOP-10, Station Blackout, Safety Function Status Checks PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSGs are not currently expected to implement Phase 1 strategy in Mode 1-5 with steam generators available. • FSG for CCW penetration isolation in Mode 6 and 5 without steam generators available • FSG for venting containment in Mode 6 and 5 without steam generators available (should continuous venting be selected)
Identify modifications	Unit 1 – Provide 8" minimum containment vent path. Figure 22 shows a proposed approach.
Key Containment Parameters	*List instrumentation credited for this coping evaluation.* Containment Temperature o Unit 1 – T-07-3A , Unit 2 – T-07-03 Containment Pressure o Unit 1 – P-07-4A . Unit 2 – P-07-4A
Notes:	References: See Attachment 4. Acronyms: See Attachment 5.

Maintain Containment

PWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time.

Phase 2 Maintain Containment - Modes 1 - 5, Steam Generators Available

No specific coping strategy is required for maintaining containment integrity during Phase 2 or 3. Any unexpected rise in containment parameters can be addressed by methods discussed below.

Phase 2 Maintain Containment - Modes 6 & 5 Without Steam Generators Available

With once through cooling and containment heat removal systems unavailable, containment pressure and temperature cannot be controlled. The containment vent path will be opened in Phase 1 to prevent pressurization that would be adverse to establishing sufficient gravity flow from the RWT for RCS makeup. No additional specific Phase 2 strategy is required.

No on-site portable equipment is required for use in Phase 2.

Details	
Provide brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Existing: • EOP-10, Station Blackout, Safety Function Status Checks PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSGs are not currently expected to implement Phase 2 strategy in Mode 1-5 with steam generators available. • FSG for venting containment in Mode 6 and 5 without steam generators available (venting on containment conditions)
Identify modifications	*List modifications* Unit 1 – Provide a containment vent path. Figure 22 shows a proposed approach.

Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Containment Temperature • Unit 1 – T-07-3A • Unit 2 – T-07-03 Containment Pressure • Unit 1 – P-07-4A • Unit 2 – P-07-4A	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**		
Seismic	*List how equipment is protected or schedule to protect* No FLEX equipment is required to implement Phase 1, 2 or 3 strategies.	
Flooding	*List how equipment is protected or schedule to protect* No FLEX equipment is required to implement Phase 1, 2 or 3 strategies.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* No FLEX equipment is required to implement Phase 1, 2 or 3 strategies.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* No FLEX equipment is required to implement Phase 1, 2 or 3 strategies.	
High Temperatures	*List how equipment is protected or schedule to protect* No FLEX equipment is required to implement Phase 1, 2 or 3 strategies.	
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* No FLEX equipment is required to implement Phase 1, 2 or 3 strategies.	*Identify how the connection is protected*
Equipment to be deployed during Phase 2: None	Unit 1 – Provide a suitably sized containment vent path.	Vent path is fully qualified.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain Containment

PWR Portable Equipment Phase 3

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time.

Phase 3 strategies for all modes of Maintain Containment will be to establish Shutdown Cooling (SDC) operation so that once-through-cooling ,with its discharge to the containment atmosphere, can be terminated. As described earlier, this requires an offsite pumping system from the RRC capable of removing heat from the reactor core and a large 4.16 KVAC diesel generator. The RRC equipment will allow ICW, CCW and SDC systems to be placed in service for eventual transition to core off load for inspection.

No additional specific phase 3 strategy is required for maintaining containment integrity. Continue with Phase 2 strategy for maintaining a vented containment. With the initiation of SDC to remove core heat, the containment will depressurize without further action. Aggressive containment cooling (i.e., initiation of containment spray) will be avoided due to containment vacuum concerns. Further review of safeguard equipment initiation with respect to the containment vacuum analysis is required. Pending Action 22

CCW flow to the containment coolers can be re-established with existing plant equipment after the cooling water circuits have time to cool.

Details

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Existing: • 1(2)- NOP-25.04, Containment Fan Coolers Operation • 1(2)-NOP-21.03 A, B, C, 1A, 1B, 1C (2A, 2B, 2C) Intake Cooling Water System Operation • 1(2)-NOP-14.02, Component Cooling Water System Operation • EOP-10, Station Blackout, Safety Function Status Checks PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG – Tie in of RRC 4.16 KVAC generator • FSG – Tie in and operation of RRC pumping system for ICW

Identify modifications	*List modifications* Unit 1 & 2 – Tie-in connections for RRC 4.16 KVAC generator Unit 1 & 2 – Tie-in connections for RRC pumping system for ICW Note: These modifications support restoration of SDC.
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Containment Temperature • Unit 1 – T-07-3A • Unit 2 – TI-07-03 Containment Pressure • Unit 1 – P-07-4A • Unit 2 – P-07-4A

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*
Equipment to be deployed during Phase 3: RRC LUHS Pumping System RRC 4.16 KVAC Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	• Unit 1 & 2 – Tie-in connections for RRC 4.16 KVAC generator • Unit 1 & 2 – Tie-in connections for RRC pumping system for ICW	All connections for the FLEX equipment will be designed to withstand and be protected from the site applicable hazards.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain Spent Fuel Pool Cooling

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

- **Makeup with Portable Injection Source**

PWR Installed Equipment Phase 1

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source) and strategy(ies) utilized to achieve this coping time.

During the BDBEE, the following conditions are assumed for SFP cooling:

1. All SFP boundaries are intact, including the liner, gates, transfer canals, etc.
2. Although sloshing may occur during a seismic event, the initial loss of SFP inventory does not preclude access to the refueling deck around the pool.
3. Unit 2 Seismic Category 1 SFP Cooling system is intact, including attached qualified piping. Unit 1 SFP cooling system is not seismic and, therefore, is not credited.
4. SFP heat load assumes maximum design basis full core offload heat load for the site.

Spent Fuel Pool cooling strategies are the same for Modes 1 through 6.

The initial phase of the FLEX SFP cooling strategy is reliant upon onsite personnel actions. Timing for these actions is dependent on SFP conditions and the timing of the BDBEE. Actions will be required early in the event if a full core discharge has just taken place (due to the time to boil which would cause FHB habitability issues). If the plant is late in the cycle, these actions can be delayed. Therefore, the Phase 2 strategy is listed under Phase 1 discussion because actions may be required early dependent on SFP conditions.

Onsite personnel actions include securing open all FHB doors, opening the large L-shaped door and staging hoses for portable makeup or spray from the SFP FLEX pump. The L-shaped door can be opened without power being available and plant procedures address methods to accomplish this task (Ref. 61). The open FHB doors will provide a ventilation pathway for steam from the SFP in addition to a pathway for laying hoses. Further evaluation will ensure the L-shaped door can be opened in the required time frame or will identify alternate means for venting the FHB. Pending Action 24

The fuel transfer tube path between containment and the spent fuel pit, if open, will be closed to separate the two areas and prevent introduction of unborated seawater into the refueling cavity from the SFP. Closure of the fuel transfer tube path can be accomplished either by installation of the transfer tube blind flange located within containment or closure of V4111, Isolation Valve For Fuel Transfer Tube Penetration (P-25), located within the Fuel Handling Building. Closure by one method is required before habitability issues prevent access to both areas.

[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.

All refuel floor hoses will be pre-staged in Phase 1 and will only require final connections at grade elevation in Phase 2 to provide flow paths for hose makeup or spray. These are makeup hoses to be placed on the refuel floor and spray hoses/portable monitor hoses to be staged on the refuel floor. Additionally a vent pathway will be established for steam to escape from the SFP in Phase 1. Time and resources necessary to validate the staging of this equipment will be validated. Pending Action 45

Details	
Provide a brief description of Procedures / Strategies / Guidelines Equipment to be deployed during this phase: Hoses for SG FLEX Pump FESB Location: Figure 7 Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	Existing: • 1(2)-AOP-04.01, "Fuel Pool Cooling System" • EDMG-01, "Guideline for Responding to Large Area Fire or Explosion Involving Multiple Fire Zones" PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures To be developed: • FSG for staging of portable SFP equipment
Identify modifications	No modifications are required for Phase 1.
Key SFP Parameter	Spent Fuel Pool Level per EA 12-051
Notes: References: See Attachment 4. Acronyms: See Attachment 5.	

Maintain Spent Fuel Pool Cooling

PWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source) and strategy(ies) utilized to achieve this coping time.

Deployment of Phase 2 SFP Cooling equipment that will become hampered by habitability issues will be staged in Phase 1. These are makeup via hoses on the refuel floor, spray capability via hoses and portable monitor nozzles on the refuel floor and a vent pathway for steam from the SF. All hoses will be pre-staged in Phase 1 and will only require final connections at grade elevation in Phase 2 to provide flow paths for hose makeup or spray.

For hose makeup, two alternate baseline capabilities exist. One makeup is provided via hoses on the refuel floor (Elevation 62') and the other makeup is provided via a hardened makeup connection with discharge at a point above the SFP.

- The makeup hose will be routed from grade elevation near the supply hose, into the FHBs via access through the roll-up door (at grade elevation), up through the stairwell located on the east side of each FHB, and over the side of the SFP.
- For the hardened makeup line, an existing 2 ½" ICW line is located on the east outside wall of each FHB. This line is flanged for potential connection of a hose providing water from the ultimate heat sink. The 2 ½" line will be modified to provide missile protection. Figure 16

For spray, a hose will be routed similarly to the above described makeup hose routing. To ensure complete fuel coverage, one spray monitor will be placed in three of the four corners of the pool. This setup guarantees full spray coverage of the pool and fuel. The spray strategy results in overspray. A flow of 250 gpm is required to be able to makeup a worst case fuel pool leak of 200 gpm (Ref. 46, Table D-3).

For all makeup and spray strategies, one hose will be routed from the staging location of the SFP FLEX pump discharge to a location in between the FHBs. This hose will be split into separate hoses each routed to a point in close proximity to each FHB. At the FHBs, the hose will be available for connection for the appropriate makeup or spray strategy.

Based on the Phase 2 SFP conditions (e.g., whether pool is intact, actual water level), personnel will choose either a makeup or spray flow path and then connect the necessary hose to a 200% capacity SFP FLEX pump.

Using the worst case design basis heat load and worst case fuel offload timing, the Unit 1 SFP will take 3.3 hours to boil and 19.3 hours to reach the level that provides 15' of water coverage above the irradiated fuel and require approximately 76 gpm of makeup water to mitigate boil-off. For a Unit 2 worst case design basis heat load and worst case fuel offload timing, it will take 3.1 hours to boil and 17.1 hours to reach the level that provides 15' of water coverage above the irradiated fuel and require approximately 85 gpm of makeup water (Ref. 15). Due to the SFP boil-off rates, the Unit 1 SFP fuel would be uncovered in 49.3 hours and the Unit 2 SFP fuel would be uncovered in 43.5

hours (Ref. 15). In most cases, the establishment of SFP cooling is not a time critical event. Based on the worst case design basis heat load and worst case fuel offload timing addressed above, makeup and spray hoses will need to be staged early in the event. This case will occur when additional refueling personnel are available and can readily focus on establishing SFP cooling as neither containment integrity nor core cooling actions are required. Makeup flow rates are bounded by the overspray requirement of 250 gpm (Ref. 46, Table D-3). Note that the B.5.b engineering evaluation (Ref. 42) considers a required flow rate of 200 gpm and does not consider overspray; use of 250 gpm per pool for overspray is bounding for FLEX purposes. The minimum flow rate for the 200% SFP FLEX pump is 500 gpm at a discharge head high enough to overcome line losses and the 42.5 foot elevation change (Ref. 10, 36). Borated water is not required to maintain sub-criticality. The SFP FLEX pump will be staged to take suction from the intake canal in accordance with the current licensing basis. The seawater makeup strategy will include periods of overfeed to mitigate seawater concentration issues within the SFP.	
	Details
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Existing: • 1(2)-AOP-04.01, "Fuel Pool Cooling System" • EDMG-01, "Guideline for Responding to Large Area Fire or Explosion Involving Multiple Fire Zones" PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG - Accessibility considerations for personnel to enter areas to perform local manual actions • FSG - Provide instructions for routing and operation of SFP makeup and sprays
Identify modifications	*List modifications* Unit 1 & 2 – Install missile protection for the 2-1/2" line on east wall of each Fuel Handling Building. This modification provides a tornado missile protected makeup line to the SFP.
Key SFP Parameter	Spent Fuel Pool Level instrumentation per EA 12-051.

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 FLEX equipment storage building (FESB) will be a single building capable of housing all FLEX equipment required to meet FLEX strategies. There will be sufficient equipment to address all functions for both units, plus one additional spare, i.e., an N+1 capability, where "N" is the number of units or 2N, where each piece of equipment is rated at 200% capacity and capable or supporting both units. FLEX equipment shall be protected and meet the requirements provided in NEI 12-06. Equipment stored in the FESB will be evaluated and protected from seismic events and a Safe Shutdown Earthquake. FLEX equipment, including the tow vehicles and debris removal equipment, will be located inside of the FLEX storage building and secured for a Safe Shutdown Earthquake, as required.
Flooding	*List how equipment is protected or schedule to protect* During a hurricane induced flooding event, access to areas in the plant, as well as access to the FESB, could be restricted due to flood waters and high winds. The strategy to maintain core cooling was developed such that access to Phase 2 FLEX equipment and access to environmentally harsh areas would not be required until the high winds had subsided and the flood waters receded.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* FESB will be designed to survive PSL design basis hurricanes, tornados and tornado missiles.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The guidelines provided in NEI 12-06 (Section 8.2.1) exclude the need to consider extreme snowfall at plant sites in the southeastern U.S. below the 35th parallel. The PSL plant site is located at approximately 27° north latitude (Ref. 2, Section 2.1.1) and thus the capability to address impedances caused by extreme snowfall with snow removal equipment need not be provided.
High Temperatures	*List how equipment is protected or schedule to protect* The climate at PSL is typical of that in southern Florida, being hot and humid in the summer and mild in the winter. The PSL site (Hutchinson Island) average maximum temperature ranges from 72°

	F in February to 87° F in August. An extreme maximum of 101°F was recorded in July 1942. (Ref. 2, UFSAR Unit 1, Table 2.3-10) FLEX equipment (i.e., pumps, diesel generators, etc.) shall be capable of operating in hot weather in excess of the site extreme maximum of 101°F which is below the threshold of 110° F discussed in NEI 12-06. (Ref. 46) It is not expected that FLEX equipment and deployment would be affected by high temperatures. Nonetheless, temperature considerations will be made with respect to procuring and maintaining equipment within design ratings and for personnel habitability. Storage of FLEX equipment in the FESB will include natural ventilation to maintain temperatures within the manufacturer's recommendations.	
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 to be deployed during Phase 2: SFP FLEX Pump FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	Unit 1 & 2 – Install missile protection for the 2-1/2" line on east wall of each Fuel Handling Building.	All connections for the FLEX equipment will be designed to withstand and be protected from the site applicable hazards.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Maintain Spent Fuel Pool Cooling

PWR Portable Equipment Phase 3

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source) and strategy(ies) utilized to achieve this coping time.

SFP cooling can be maintained indefinitely using Phase 2 strategy on both Unit 1 and Unit 2.

Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Existing: • 1(2)-AOP-04.01, Fuel Pool Cooling System • EDMG-01, Guideline for Responding to Large Area Fire or Explosion Involving Multiple Fire Zones PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • None currently identified.
Identify modifications	*List modifications* None currently identified. Phase 2 strategy is continued during Phase 3.
Key SFP Parameter	SFP level instrumentation per EA 12-051

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 to be deployed during this phase: RRC LUHS Pumping	None currently identified. Phase 2 strategy is continued during Phase 3.	All connections for the FLEX equipment will be designed to withstand and be protected from the site applicable hazards.

System RRC 4.16 KVAC Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4		
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Safety Functions Support

Determine Baseline coping capability with installed coping[5] modifications not including FLEX modifications.

Instrumentation Strategy:

Essential instrumentation and control functions will be maintained by the 125 VDC Class 1E batteries which are designed to power the safety related instrumentation for a minimum of four hours. To extend this coping period, non-essential loads will be shed as early as possible. Phase 1 strategy is to perform the load shed actions of EOP-10, Station Blackout and EOP-99, Appendices / Figures / Tables / Data Sheets, with revisions for extended load shedding for the class 1E batteries within 30 and 60 minutes of the FLEX event. Inverters C & D will be shed within the first 30 minutes. (Ref. 8, 9)

This strategy utilizes existing plant equipment to demonstrate regulatory compliance for the required functions. Extended load shedding will extend the battery powered instrumentation monitoring function on Unit 1 to approximately 12 hours and 11 hours for 1A and 1B station batteries, respectively, and on Unit 2 to approximately 10 hours and 9 hours for 2A and 2B station batteries, respectively. The following parameters will be available to monitor and control the units:

- Reactor Coolant System Hot Leg Temperature (Thot)
- Reactor Coolant System Cold Leg Temperature (Tcold)
- Reactor Coolant System Wide Range Pressure
- Steam Generator Narrow Range or Wide Range Level
- Core Exit Thermocouple Temperature
- Reactor Coolant System Passive Injection (Safety Injection Tank) Level
- Pressurizer Level
- Reactor Vessel Level Indicating System
- Containment Pressure
- Containment Temperature
- Auxiliary Feed Water Pump Flow
- Steam Generator Pressure
- Condensate Storage Tank Level
- Battery Capacity/DC Bus Voltage
- Neutron Flux
- Spent Fuel Pool Level
- Refueling Water Tank Level
- Refueling Cavity Level

Evaluations are in progress to determine appropriate alternate locations for obtaining critical parameters (e.g., at containment penetrations). Pending Action 8

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

Electrical Strategy:

ELAP recovery initially requires shedding of non-essential DC loads in Phase 1 to extend station battery life so that essential instrumentation will be available to monitor event progression. Subsequent deployment of a 480VAC FLEX diesel generator in Phase 2 repowers battery chargers and other selected loads. In Phase 3, a 4.16 KVAC FLEX diesel generator will be deployed after delivery from offsite. The tie-in points for FLEX generators, depicted in Figure 1, Figure 2, are discussed in subsequent sections. An overview of the Electrical Strategy is provided in a tablular format in Figure 3.

DC and Extended DC Load Shedding

Essential instrumentation and control functions are maintained by 125 VDC Class 1E batteries. For a Station Blackout Rule scenario (NRC Rule 10CFR50.63), the batteries are required to provide power until the SBO Alternate AC (AAC) Crosstie can restore AC power. However, existing design calculations conclude that the Class 1E batteries are sized to support a four hour SBO event without manual load shedding or the use of the AAC Crosstie. In addition, non-essential loads can be shed as outlined in station procedures (Ref 50, 51) to support extending the battery life.

Manual load shedding in a FLEX response to an ELAP will increase the duration of the battery powered instrumentation monitoring function on Unit 1 to approximately 12 hours and 11 hours for 1A and 1B station batteries respectively and on Unit 2 to approximately 10 hours and 9 hours for 2A and 2B station batteries respectively. (Ref. 8, 9). 1(2)-EOP-99 (Ref. 51) will be revised to incorporate the manual load shedding strategy.

Further evaluation of the manual shedding strategy is required to address potential spurious actions stemming from de-energizing multiple instrument buses. Pending Action 7

Control Room (CR) Lighting and Plant Ventilation Strategy

Following load shedding CR lighting will be provided using portable battery operated lighting. The portable lighting will be stored in designated lockers adjacent to the CR where it is protected from external hazards and close to the deployment location. When the FLEX 480 VAC diesel generator is available, power to the CR lighting panels will be restored.

Preliminary analysis indicates the loss of Control Room ventilation requires supplemental ventilation to mitigate room heat-up. A cross-flow ventilation path will be established by opening CR (and Unit 1 Technical Support Center (TSC)) east and west doors. A more detailed evaluation of the supplemental CR ventilation will be performed to address sizing and deployment response times. Pending Action 11, 27

The temperature in Electrical Equipment Rooms (EER) 1A, 1B, and 1C following an ELAP condition was evaluated. (Ref. 11). The purpose of this evaluation was to determine if any recovery actions will be required to maintain operability of the equipment in the EER's. The results of this evaluation indicated that the maximum temperature in any one of the EER's is approximately 129°F. Appendix F of NUMARC 87-00 (Ref. 47) states that most equipment outside of containment is expected to operate in temperatures not to exceed 150 °F for a duration of 4 hours. There is no generic industry guidance on equipment operability for the longer 72 hour ELAP scenario. A more detailed evaluation will be performed to justify operation up to a temperature of 129 °F for 72 hours or portable fans will be provided. Pending Action 12

Other areas of the Reactor Auxiliary Building (RAB) do not require supplemental ventilation to support equipment function or habitability post-BDBEE event as they will contain little energized or heated equipment. Air flow may be accomplished by opening of doors for cross-flow ventilation. The turbine driven Auxiliary Feedwater Pumps are located outdoors under the main steam and feedwater trestles in an elevated area well ventilated by natural circulation. Further evaluation is required regarding the Mode 6 &5 (without steam generators) strategy to vent containment through the personnel hatch or purge system. Pending Action 20

Communications Strategy

St. Lucie plant communications capabilities are robust and diverse (Ref. 2). The communication systems include multiple technologies, redundant power supplies, and the capability to operate with substantial impairment to communications equipment in the surrounding community. In the event of massive system failures, onsite and offsite communication requirements will continue to be met with the combination of sound power phones, satellite phones, and point-to-point radio (Ref. 62).

During Phase 1, sufficient batteries will be available to power plant radios and satellite phones until the FLEX 480 VAC diesel generator is available to supply power to the radio and phone chargers located in the CR and TSC. This strategy will cover the 8 hour period of Phase 1 and an additional period of 4 hours to recharge expended batteries.

Communications adequacy will be evaluated during the Phase 2 staffing study to identify any deficiencies. Pending Action 6

FLEX Equipment Support Building (FESB)

Onsite portable FLEX equipment used during Phase 2 and 3 of the FLEX coping strategies will be stored and protected in a structure that meets the external hazards requirements of NEI 12-06 (Ref. 46).

The FLEX equipment storage building (FESB) will be a single building capable of housing the FLEX equipment required to meet FLEX strategies. Proposed location and layout are depicted in Figure 7 and Figure 8.

To meet the requirements of NEI 12-06 (Ref. 46), the FESB will be designed to meet PSL design basis for:

- Safe Shutdown Earthquake (Ref. 2, Section 3.7).
- Probable Maximum Flood (PMF) (Ref. 2, Section 3.4). The building will be water tight to the level of PMF or the finished floor level will be above PMF level.
- High wind hazards due to hurricanes, tornados and tornado missiles (Ref. 2, Section 3.3) UFSAR extreme high temperature of 101°F (Ref. 2, UFSAR Unit 2, Table 2.3-37) will be considered with respect to maintaining equipment within manufacturer's design ratings.

PWR Installed Equipment Phase 1	
Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Existing: • EOP-10, Station Blackout • EOP-99, Appendices / Figures / Tables / Data Sheets (Include requirements for extended load shedding) • 0-NOP-59.06, Fuel Oil Transfer Between Diesel Fuel Oil Storage Tanks PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG for establishing FLEX Control Room Ventilation • FSG for FLEX Equipment refueling strategy • Modification to EOP-99 for guidance on Main Control Lighting, ventilation and DC bus load shedding • New procedures for use of Satellite communications • FSG for restoration of AC power or alternate power sources for specific plant equipment • FSG for the identification of lighting and communications necessary for ingress and egress to plant areas required for deployment of FLEX strategies
Identify modifications	*List modifications and describe how they support coping time.* Unit 1 & 2 - Modify instruments or power supplies such that instruments are powered from station batteries via inverters (120 VAC vital power). This modification will ensure that operations personnel have the necessary instrumentation to monitor and operate the plant during Phase 1 of the event.

Instruments to be Repowered from Vital AC sources (Battery Backed)

Unit 1	
T-1115, T-1125	RCS Wide Range T-Cold
T-1111X, T-1121X	RCS T-Hot
L-1117-1	RCS Wide Range Level
J-001, J-002	Source Range Neutron Monitoring
L-3311, L-3321 L-3331, L-3341	SIT Level
L-1110X, L-1110Y	Pressurizer Level
F-09-2C	Steam Driven AFW Pump Flow
Unit 2	
T-1115, T-1125	RCS Wide Range T-Cold
T-1111X, T-1121X	RCS T-Hot
L-1117-1	RCS Wide Range Level
L-3312, L-3322 L-3332, L-3342	SIT Level

TSC and EOF – Install external satellite phone antenna and docking stations. This will provide a means of providing continuous communications during severe weather conditions.

FLEX Equipment Storage Building This modification will provide protection for all FLEX equipment against all applicable defined site hazards.

Key Parameters

List instrumentation parameters credited for this coping evaluation phase.

- Reactor Coolant System Hot Leg Temperature (Thot)
- Reactor Coolant System Cold Leg Temperature (Tcold)
- Reactor Coolant System Wide Range Pressure
- Steam Generator Narrow Range or Wide Range Level
- Core Exit Thermocouple Temperature
- Reactor Coolant System Passive Injection (SIT) Level
- Pressurizer Level
- Reactor Vessel Level Indicating System
- Containment Pressure
- Containment Temperature
- Auxiliary Feed Water Pump Flow
- Steam Generator Pressure
- Condensate Storage Tank Level

	• Battery Capacity/DC Bus Voltage • Neutron Flux • Spent Fuel Pool Level • RWT Level • Cavity Level (WR) • DC Bus Voltage Evaluations will determine alternate remote locations for obtaining critical parameters using portable instruments. Pending Action 8
Notes:	References: See Attachment 4. Acronyms: See Attachment 5.

Safety Functions Support

PWR Portable Equipment Phase 2

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

480 VAC Electrical Power

Manual load shedding of DC loads will increase the duration of the battery powered monitor function to 11 hours on Unit 1 and 9 hours on Unit 2 (Ref. 8, 9) for the most limiting electrical train (B). Manual load shedding will commence within 30 to 60 minutes following the event. The Instrument Inverters C and D will be shed in the first 30 minutes. This option utilizes existing plant equipment to demonstrate regulatory compliance for the required functions.

Phase 2 coping strategy following an ELAP event is to deploy and connect a 480 VAC diesel generator to power select loads. The primary loads to receive FLEX power from the Phase 2 FLEX diesel generator are the battery chargers that supply the Class 1E 125 VDC Buses. In addition, a charging pump, selected MOVs and other equipment deemed necessary to successfully implement FLEX strategies will be repowered.

Loads to be powered:

- Safety Related Battery Chargers
- Control Room & Technical Support Center Lighting
- Communications Equipment
- Battery Room Ventilation
- Portable Fans for Control Room, Technical Support Center & Electrical Equipment Rooms
- Charging Pump
- Boric Acid Batching/Blending Equipment
- Boric Acid Makeup Pump
- Select MOVs (e.g., SIT isolation valves, Boric Acid Makeup valves)

Further evaluation of the 480 VAC Diesel Generator loads is required to appropriately size the FLEX equipment. Pending Action 9

Refueling Diesel Powered FLEX Equipment Strategy

The diesel fuel oil (DFO) trailer is a Transfueler 500 gallon diesel fuel oil tank (Ref. 64). The tank is mounted on a trailer with a 12v battery operated pump capable of delivering up to 25 gpm. The trailer will be towed by a FLEX tow vehicle or equivalent. The DFO trailer tank will be filled by gravity feed from the Unit 2 Diesel Oil Storage Tanks. The Unit 2 Diesel Oil Storage Tanks are fully qualified for seismic, wind, missiles and flooding. Each tank contains greater than 42,500 gallons of fuel oil (Ref. 1, TS 3.8.1.1). Gravity feed is accomplished by either draining through the 3" fill connection (V17202) or the two 2" tank drains (V17200, V17211). The Transfueler DFO tank will be stored in the FESB. Guidance will be developed to provide operating instructions, fuel burnup rates and fueling strategies for all portable diesel driven FLEX equipment. Pending Action 80

FLEX Equipment Instrumentation Strategy

FLEX equipment used in phases 2 and 3 of most coping strategies is equipment with various levels of instrumentation to monitor the equipment's operating performance. The amount of instruments available should be adequate to ensure the proper operation of the FLEX equipment. Typical instrumentation that may be installed on various FLEX equipment include:

Generic Portable FLEX Equipment Instrumentation		
Diesel Generator	**Diesel Driven Pump**	**Diesel Air Compressor**
Generator	**Pump**	**Compressor**
Voltage	Discharge Pressure	Discharge Pressure
Current	Flow	
Wattage		
Frequency		
Diesel	**Diesel**	**Diesel**
Oil Pressure	Oil Pressure	Oil Pressure
Water Temperature	Water Temperature	Water Temperature
Fuel Level	Fuel Level	Fuel Level
Battery Voltage (Prestart)	Battery Voltage (Prestart)	Battery Voltage (Prestart)
Coolant Level (Prestart)	Coolant Level (Prestart)	Coolant Level (Prestart)
	Speed	

Instrumentation readings will be monitored and recorded during FLEX equipment operation. Data sheets or other suitable methods of recording instrument data will be included in FLEX equipment operational procedures or guidance.

Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* PSL will use industry guidance from the PWROG to develop site specific procedures or guidelines to address criteria in NEI 12-06. The procedures and/or guidelines developed will support existing command and control strategies within existing plant procedures. To be developed: • FSG for operation of DFO transfueler, filling from U2 DFO tanks, filling FLEX portable equipment, etc. • FSG for tie-in of 480 VAC FLEX Generator to station 480 VAC buses • FSG for power restoration with ESF signals present due to de-energized instrument inverters

Identify modifications	*List modifications necessary for phase 2* Unit 1 & 2 – Tie-in connection(s) for 480 VAC FLEX Generator to station buses. (Figure 1, Figure 2) Modification provides for re-powering of station battery chargers and other selected loads.
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* DFO Storage Tank Level (Local indication) • LIS-17-9A, 2A Diesel Oil Storage Tank Level • LIS-17-9B, 2B Diesel Oil Storage Tank Level
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 FLEX equipment storage building (FESB) will be a single building capable of housing all FLEX equipment required to meet FLEX strategies. There will be sufficient equipment to address all functions for both units, plus one additional spare, i.e., an N+1 capability, where "N" is the number of units or 2N, where each piece of equipment is rated at 200% capacity and capable or supporting both units. FLEX equipment shall be protected and meet the requirements provided in NEI 12-06. (Ref. 46) Equipment stored in the FESB will be evaluated and protected from seismic events and a Safe Shutdown Earthquake. All FLEX equipment, including the tow vehicles and debris removal equipment, will be located inside of the FLEX storage building and will be secured for a Safe Shutdown Earthquake.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* During a hurricane induced flooding event, access to areas in the plant, as well as access to the FESB, could be restricted due to flood waters and high winds. The strategy to maintain core cooling was developed such that access to Phase 2 FLEX equipment and access to environmentally harsh areas would not be required until the high winds had subsided and the flood waters receded.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* FESB will be designed to survive hurricane force winds and missiles.

Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The guidelines provided in NEI 12-06 (Ref. 46, Section 8.2.1) exclude the need to consider extreme snowfall at plant sites in the southeastern U.S. below the 35th parallel. The PSL plant site is located at approximately 27° north latitude (Ref. 2, Section 2.1.1) and thus the capability to address impedances caused by extreme snowfall with snow removal equipment need not be provided.	
High Temperatures	*List how equipment is protected or schedule to protect* The climate at PSL is typical of that in southern Florida, being hot and humid in the summer and mild in the winter. The PSL site (Hutchinson Island) average maximum temperature ranges from 72° F in February to 87° F in August. An extreme maximum of 101°F was recorded in July 1942. (Ref. 2, Table 2.3-10) FLEX equipment (i.e., pumps, diesel generators, etc.) shall be capable of operating in hot weather in excess of the site extreme maximum of 101°F (Ref. 2) which is below the threshold of 110° F discussed in NEI 12-06 (Ref. 46). It is not expected that FLEX equipment and deployment would be affected by high temperatures. Nonetheless, temperature considerations will be made with respect to procuring and maintaining equipment within design ratings and for personnel habitability. Storage of FLEX equipment in the FESB will include natural ventilation to maintain temperatures within the manufacturer's recommendations.	
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. Equipment to be deployed during Phase 2: 480 VAC FLEX Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	*Identify modifications* • Unit 1 & 2 – Tie-in connection(s) for 480 VAC FLEX Generator to station buses. (Figure 1, Figure 2)	*Identify how the connection is protected* • Fueling of the diesel fuel oil trailer tank is accomplished by gravity feed from existing fill or drain valves on the DFO storage tanks. These valves are protected by the DFO storage tank buildings.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

Safety Functions Support

PWR Portable Equipment Phase 3

Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Phase 3 coping strategy following an ELAP event is to deploy and connect a 4.16 KVAC diesel generators from the Regional Response Center (RRC) to power select loads. This strategy would restore power to most of the electrical distribution system, lighting, and communications loads which were not damaged by the ELAP event via installed electrical distribution systems or through manually routed cables to the individual loads.

Loads to be powered:

- Component Cooling Water Pump
- Component Cooling Water Heat Exchanger Debris Filter
- Low Pressure Safety Injection Pump (Shutdown Cooling)
- 2 Containment Fan Coolers
- Control Room Ventilation
- Shield Building Exhaust Fans

Further evaluation of the 4.16 KVAC Diesel Generator loads is required to determine the RRC FLEX equipment requirements. Pending Action 10

Details	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.*
Identify modifications	*List modifications necessary for phase 3* • Unit 1 & 2 – Install a modification on the Class 1E 4.16 KVAC Switchgear 1A3 (2A3) for connection of a 4.16 KVAC FLEX diesel generator. This will be the primary connection for the FLEX offsite 4.16 KVAC RRC diesel generator. An alternate connection point will be installed on the Class 1E 4.16 KVAC Switchgear 1AB (2AB). Figure 1, Figure 2 • Unit 1 and 2 – Tie-in connections and valves for RRC LUHS pump system for ICW. This modification will reestablish the UHS in support of long term RCS cooling. Figure 17, Figure 18
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.*

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 to be deployed during this phase: RRC 4.16 KVAC Generator FESB Location: Figure 7 RRC Staging Area: TBD Deployment Routes: Figure 9 FESB deployment routes will be analyzed for liquefaction. Pending Action 4	• Unit 1 & 2 – Install a modification on the Class 1E 4.16 KVAC Switchgear 1A3 (2A3) for connection of a 4.16 KVAC FLEX diesel generator. An alternate connection point will be installed on the Class 1E 4.16 KVAC Switchgear 1AB (2AB). Figure 1, Figure 2 • Unit 1 & 2 – Tie-in connections and valves for RRC LUHS pump system for ICW. Figure 17, Figure 18	All connections for the FLEX equipment will be designed to withstand and be protected from the site applicable hazards.
Notes: References: See Attachment 4. Acronyms: See Attachment 5.		

PWR Portable Equipment Phase 2 **Note: The amount of portable FLEX equipment necessary to support all FLEX strategies will meet either N+1 or 2N requirements.**							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
CST FLEX Pump	X	X				300 gpm per unit	Will follow vendor and EPRI template requirements
SG FLEX Pump	X	X				300 gpm @ 300 psi	Will follow vendor and EPRI template requirements
SFP FLEX Pump			X			250 gpm per unit	Will follow vendor and EPRI template requirements
480 VAC FLEX Diesel Generator	X	X		X		Power to battery chargers and other selected equipment	Will follow vendor and EPRI template requirements
Hose, hose adapters, tools, spray monitors, lights, fans, etc.	X	X	X			All support equipment to be rated for application	Will follow vendor and EPRI template requirements
Communications Equipment	X	X	X	X	X	Support Communications (All strategies)	Will follow vendor and EPRI template requirements
Portable Lighting					X		Will follow vendor and EPRI template requirements
Bobcat					X		Will follow vendor and EPRI template requirements

PWR Portable Equipment Phase 2 **Note: The amount of portable FLEX equipment necessary to support all FLEX strategies will meet either N+1 or 2N requirements.**							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Heavy Duty Truck	X		X	X			Will follow vendor and EPRI template requirements
Diesel Oil Refueler	X		X	X		Provide DFO to all portable diesel driven FLEX equipment	Will follow vendor and EPRI template requirements

PWR Portable Equipment Phase 3 **Note: The amount of portable FLEX equipment necessary to support all FLEX strategies will meet either N+1 or 2N requirements.**							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	*Core*	*Containment*	*SFP*	*Instrumentation*	*Accessibility*		
RRC 4.16 KVAC FLEX Diesel Generators	X	X		X		2MW, 4.16 KVAC	Power 4.16 KVAC safety related bus(s)
RRC FLEX LUHS Pumping System	X	X				7162 gpm, 90 psi	ICW for 1 train of CCW in SDC service

Performance criteria is preliminary; equipment provided may differ.

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	
Commodities • Food • Potable water • Diesel Fuel	
Fuel Requirements • Unit 2 Diesel Fuel Oil Storage Tank	
Heavy Equipment • Transportation equipment • Debris clearing equipment	

Attachment 1A
Sequence of Events Timeline
Modes 1-5, SGs Available

Action	Elapsed Time (hr)	Action following Loss of All AC Power, Loss of UHS	Time Constraint Y/N [6]	Remarks / Applicability
1	0 - 1	Establish CR cross-flow ventilation	Y	Support Habitability
2	0.5 - 1	DC and extended DC load shedding	Y	EOP-99, Prolongs battery life
3	0 - 4	Deploy debris removal equipment	N	Support FLEX deployments
4	0 - 2	Open FHB doors and route hoses for SFP makeup and spray strategy paths	Y	Complete prior to FHB habitability issue
5	6 - 8	Deploy 480 VAC FLEX diesel generator	Y	Start prior to battery depletion
6	8	Battery Chargers in service and temporary Battery Room Ventilation installed	Y	Prior to commencing battery charging
7	8+	Power CR lighting from 480 VAC FLEX generator	N	Portable lighting remains available
8	10 - 12	Deploy SG FLEX pump for SG Makeup	Y	TDAFW failure contingency during cooldown
9	10 - 14	Cooldown RCS to SG pressure 120 psia	N	Procedurally controlled during cooldown SIT Discharge: U1 RCS <200 psia, U2 RCS <625 psia
10	10+	Restore Power to SIT outlet valves (MOVs)	Y	Ensures SITs can be isolated during cooldown
11	10	Power charging pump, CVCS MOVs and begin boration from BAM Tanks	N	Procedurally controlled per plant conditions
12	12	Cross-tie Unit 1 & 2 CSTs	Y	Extends U1 CST from 16 hrs to 29 hrs (shared)
13	13	Isolate SITS (as required by RCS leak rate)	N	Procedurally controlled per plant conditions
14	15 - 17	CST FLEX pump installed for CST Fill (from RWT or other available source)	Y	Complete prior to expending CST volumes in ~29 hrs
15	72	Receive 4.16 KVAC diesel generator and LUHS Pumping System from RRC	N	Continue with Phase 2 strategies
16	72+	Deploy 4.16 KVAC diesel generator and LUHS pumping system	N	Provide Fuel
17	112	Establish ICW flow to CCW Hx	N	Establish ICW Flow
18	114	Power CCW Pump and establish flow to SDC HX, LPSI Pump (U1) & 2 CFCs	N	Establish CCW Flow
19	118	Power LPSI Pump and establish SDC Flow	N	Establish SDC Flow
20	120	Begin Phase 3 – ELAP/LUHS Mitigated	N	Procedurally controlled for desired plant conditions
21	120+	Power 2 CFCs	N	Establish Containment Cooling

[6] Provide justification for No or NA in Remarks column, If yes include technical basis discussion per NEI 12-06 Section 3.2.1.7

Sequence of Events Timeline
Modes 5 and 6, SGs Not Available

Action	Elapsed Time (hr)	Action following Loss of All AC Power, Loss of UHS	Time Constraint Y/N [7]	Remarks / Applicability
1	0 - 1	Establish Gravity Feed flow path from RWT	Y	Complete before core uncovery
2	0 -1	Vent Containment	Y	Ensure gravity flow to RCS Complete before Containment pressurizes
3	0 - 2	Isolate Fuel Transfer Tube pathway	Y	Complete before habitability issues prevent closure V4111 in FHB, blind flange in RCB
4	4 - 6	Isolate CCW Flow to Containment Cooler Penetrations	Y	Complete before exceeding containment temperature of 212F to avoid voiding within cooling water circuits
5	6 - 8	Deploy SG FLEX pump for RCS Makeup	Y	Complete before 8 hours for MODE 5 Once Through Cooling with PORVs
6	27	Vent Containment (If Containment is closed)	Y	Complete before exceeding 44 psig/264F containment design conditions

Milestones unique to Modes 5 and 6 without Steam Generators available

[7] Provide justification for No or NA in Remarks column, If yes include technical basis discussion per NEI 12-06 Section 3.2.1.7

Attachment 1B
NSSS Significant Reference Analysis Deviation Table

Item	Parameter of interest	WCAP value (WCAP-17601-P August 2012 Rev 0)	WCAP page	Plant applied value	Gap and discussion
	WCAP Section 3.2 - Recommendations for Combustion Engineering Plants				
1	CBO isolation	Isolate CBO line early in event to cool RCP seals. If necessary, perform mod to support.	3-11	Loss of Instrument Air on ELAP isolates CBO (FC valve). 1/2-EOP-10 Step 6, Station Blackout, confirms CBO is isolated	No Gap
2	Procedure should drive plant cooldown to complete in 24 hrs	Complete cooldown within 24 hours to ensure adequate shutdown margin	3-12	Complete cooldown in 14 hrs	No Gap
3	Procedures should promote early and extensive cooldown and depressurization after ELAP	Complete cooldown early to preserve RCP seals, maintain shutdown margin, allow use of portable alternative makeup pumps with lower shutoff head. WCAP promotes 2 hr start time in other locations.	3-13 5-148	Begin RCS symmetric natural circulation cooldown and depressurization in 10 hours at a rate of 75 °F/hr. Complete RCS cooldown in 14 hrs. SG 120 psia.	Seal failure risk is very low, new low leakage shutdown seals will further lower seal risk. 10 hour timeframe supports onsite staff prioritization on near term issues.
4	Plant cooldown	Do not preclude cooldown and depressurization based on potential for solid plant conditions	3-14	EOP/FSG will provide cooldown and SIT isolation guidance	No Gap
5	Portable makeup pump (AFW)	Provide portable backup pump, Size not stated. Recommends 300 gpm/300 psi for W PWRs	3-15 3-8	SG FLEX Pump to be sized at 300 gpm/300 psi per WCAP	No Gap
6	SIT nitrogen injection	Preclude nitrogen injection by isolating SITs or depressurizing , monitor RCS pressure	3-15	EOP/FSG will provide cooldown / SIT guidance	No Gap
7	Asymmetric cooldown	Open MSSVs in event of ADV failure Drain affected SG to remove liquid inventory	3-16	FLEX scenarios do not address single failure	No Gap - Both ADVs in service for symmetric NC cooldown
	WCAP Section 3.4 – Recommended Instrumentation for an ELAP				
	Instrumentation	Recommended List of instrumentation for monitoring ELAP event development	3-20	PSL strategy instrumentation in full compliance	No Gap

St. Lucie will follow technical basis as described in WCAP-17601-P. If any deviations from WCAP-17601-P are identified, site specific analyses will be performed to provide the technical basis for any strategies, assumptions, acceptance criteria, time constraints or other deviations from WCAP-17601-P. These analyses will be provided during six month updates to the submittal. Pending Action 25

Attachment 2
Milestone Schedule

Milestone Schedule			
Target Dates		**Activity**	**Status / Remarks**
Start	**Complete**		
	Feb 2013	Submit Overall Integrated Implementation Plan	Complete
	Feb 2013	Contract with Regional Response Center established	Complete
	Aug 2013	Six Month Update	
May 2013	Feb 2014	Develop FLEX Strategies	
	Feb 2014	Six month Update	
Jul 2013	Mar 2014	Develop FLEX Guidelines	
Aug 2013	Mar 2014	Develop/Revise OPS procedures (EOP / AOP / OSP)	
Nov 2013	Mar 2014	Develop Maintenance Procedures	
Jan 2014	Jun 2014	Develop Training Plan and Materials	
	Aug 2014	Six Month Update	
May 2013	Oct 2014	FLEX Equipment Proposals, Procurement and Acquisition	
Jul 2014	Oct 2014	Perform Staffing Analysis (Phase 2)	
	Feb 2015	Six Month Update	
Jul 2014	Mar 2015	Training	
	Mar 2015	FLEX Equipment Storage Building Complete	
Feb 2015	Mar 2015	Unit 1 Implementation/Modification Outage	
	Mar 2015	Unit 1 Full Compliance	
	Aug 2015	Six Month Update	
Oct 2015	Nov 2015	Unit 2 Implementation/Modification Outage	
	Nov 2015	Unit 2 Full Compliance	

Attachment 3
Figures

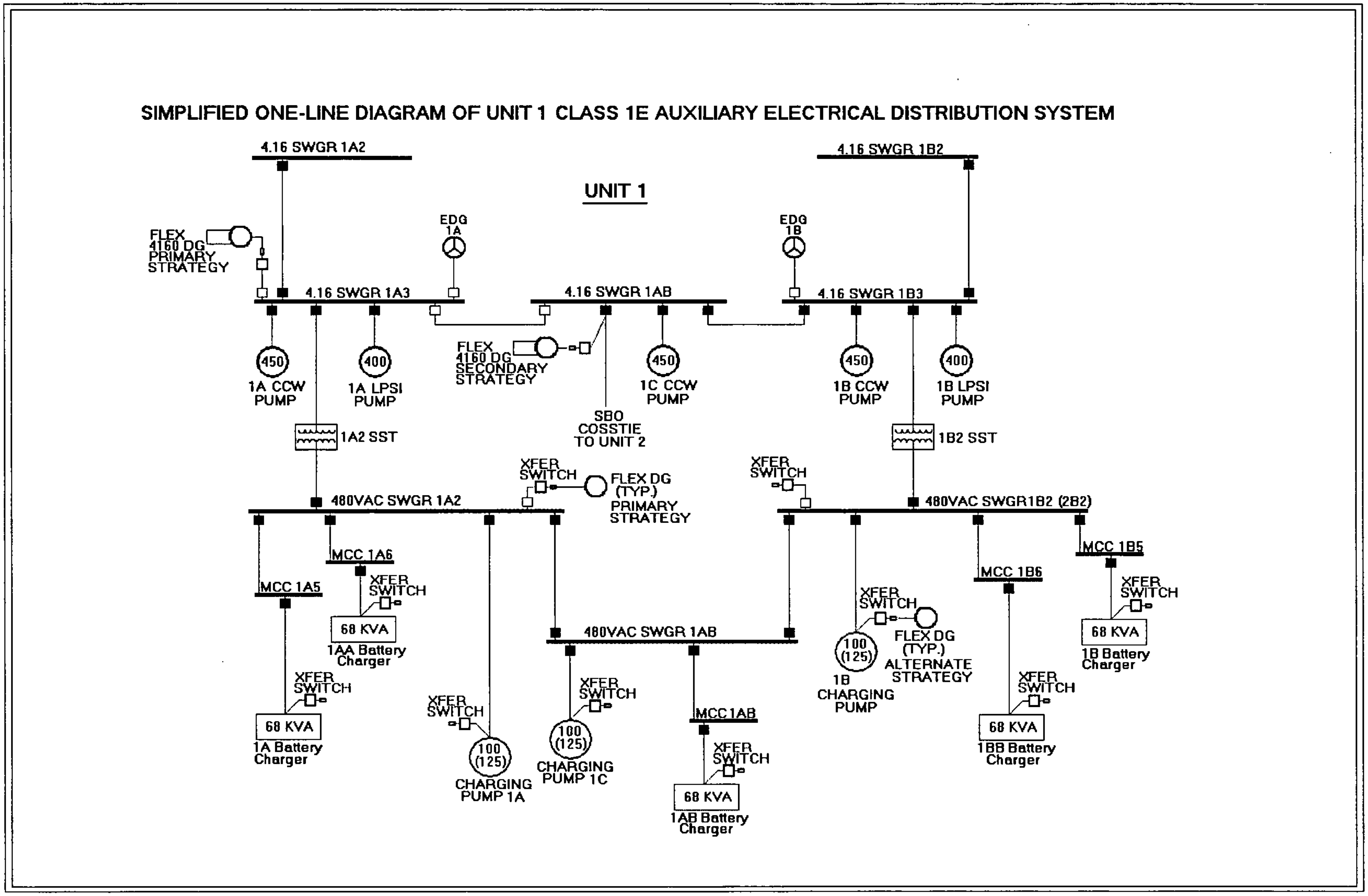


Figure 1 PSL FLEX Electrical Connections (Unit 1)

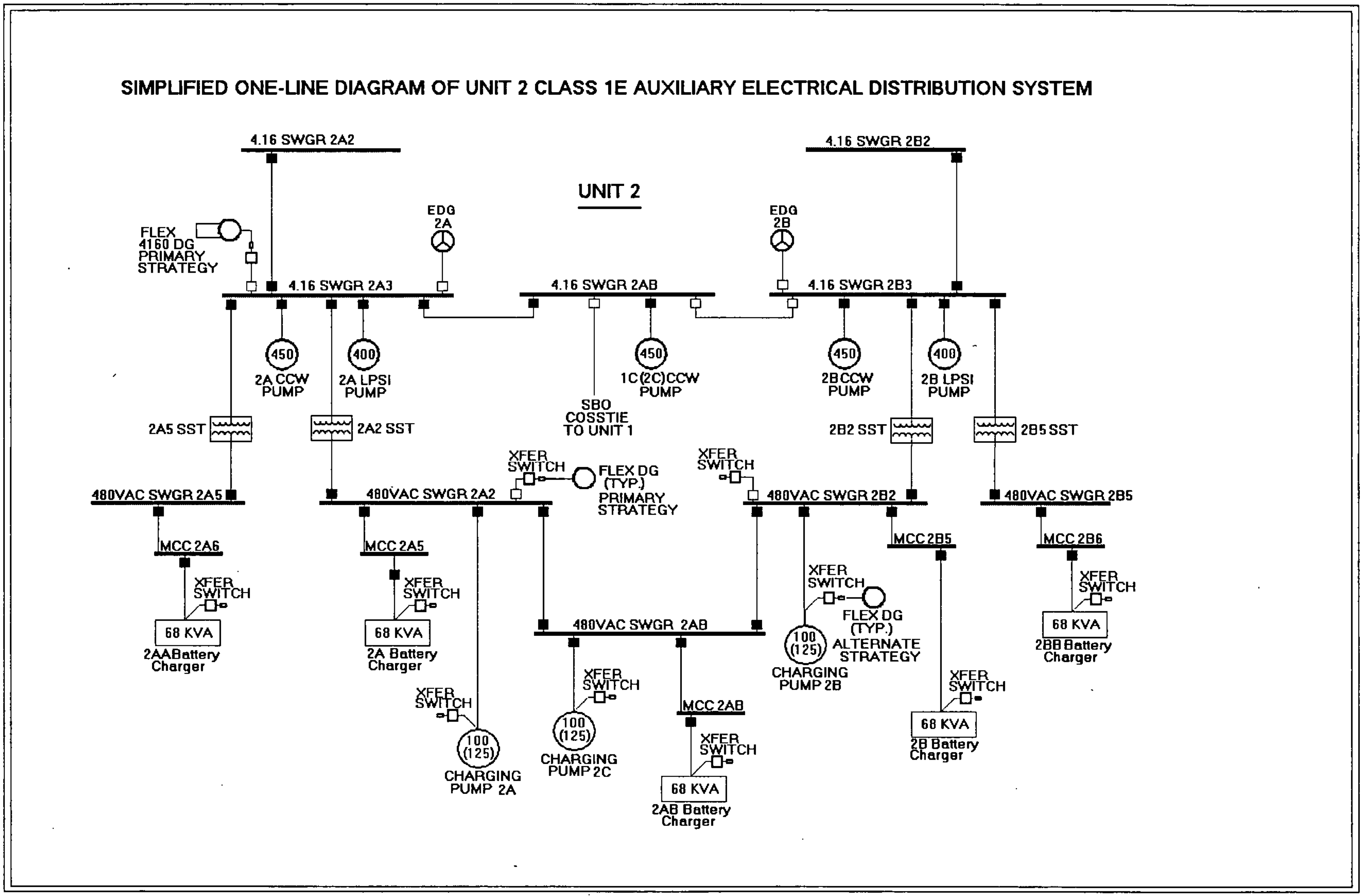


Figure 2 PSL FLEX Electrical Connections (Unit 2)

	125V DC		120V AC Bus		480V AC Bus		4160V AC Bus	
	Strategy	**Method**	**Strategy**	**Method**	**Strategy**	**Method**	**Strategy**	**Method**
Phase 1	• Provide Critical Instrumentation • TDAFW • Portable Lanterns	125VDC Buses supplied by Battery 1A & 1B	120VAC Instr. Power available via Inverter	N/A	480VAC not available	N/A	4160VAC not available	N/A
Phase 2	• Charge 125VDC Batteries • Power: • Critical Instrumentation Control Room • Emergency Lighting	Power: 480VAC from FLEX DG to Supply DC Buses 1A & 1B	Power: 120VAC Bus Power: Plant PA Plant Communications	Power: 120VAC Instrument Bus via FLEX DG	Power: 120V Buses 1A2 & 1B2 Power: Battery Chargers 480V MCC	Power: 480V Buses 1A2 & 1B2 via FLEX DG	4160VAC not available	N/A
Phase 3	• Charge 125VDC Batteries • Power: o Critical Instrumentation Control Room o Emergency Lighting	Power: 480VAC from FLEX DG	Power: 120VAC Bus	Power: Instrument Bus via FLEX DG	Power: 120V Buses 1A2 & 1B2 Power: Battery Chargers 480V MCC	Power: 480V Buses 1A2 & 1B2 via FLEX DG	Power: 4160VAC Bus	Power: 4160VAC Bus via RRC FLEX 4.16 KVAC DG Disconnect Small DG as 4160VAC Bus is powered

Figure 3 PSL FLEX Electrical Connections (Phase 1-3 Strategy Table)

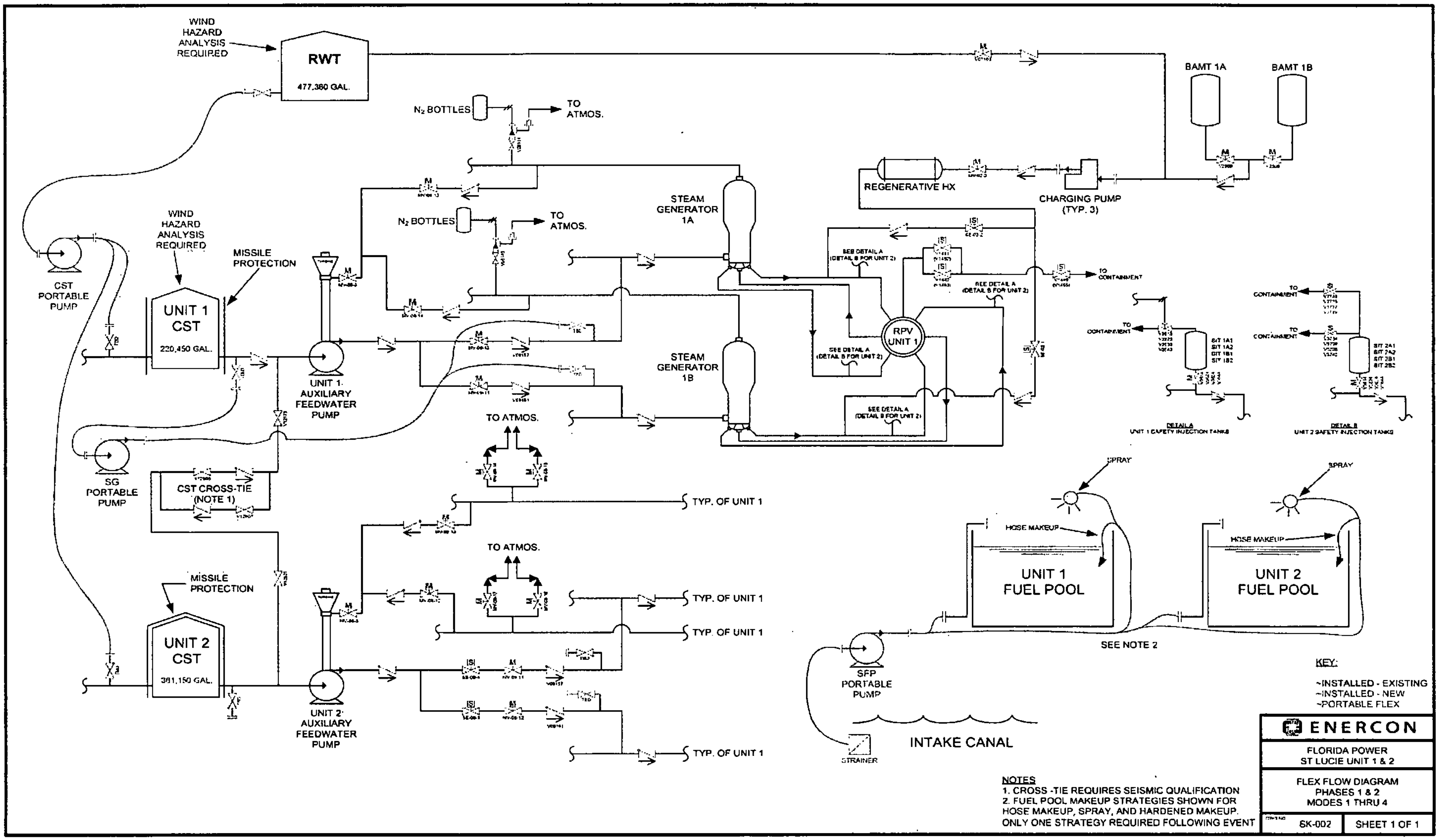


Figure 4 PSL FLEX Flow Diagrams Phases 1 & 2 (Modes with SGs available)

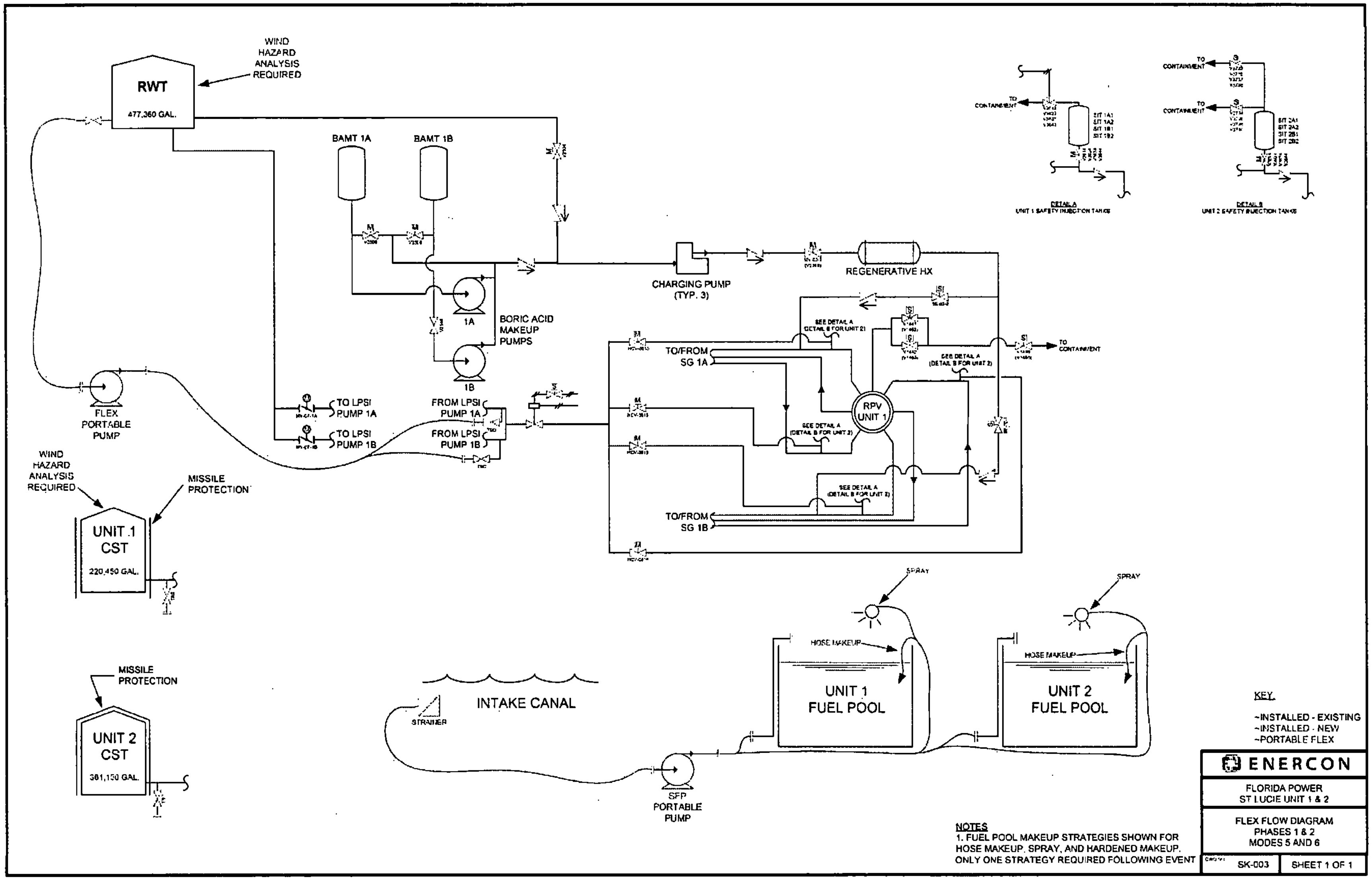


Figure 5 PSL FLEX Flow Diagrams Phases 1 & 2 (Modes without SGs - Once-Thru-Cooling)

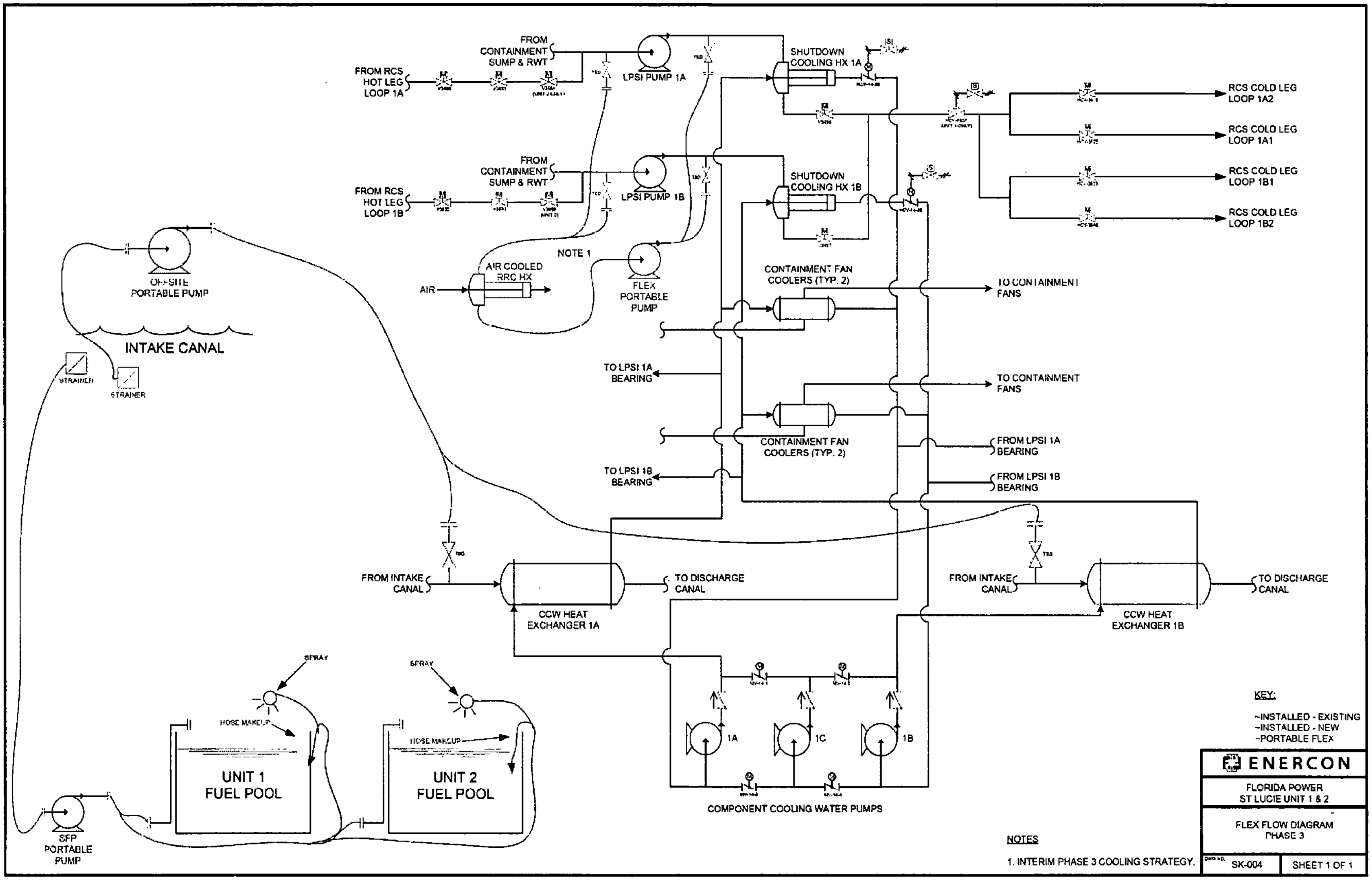


Figure 6 PSL FLEX Flow Diagrams Phase 3 – Longterm Shutdown Cooling

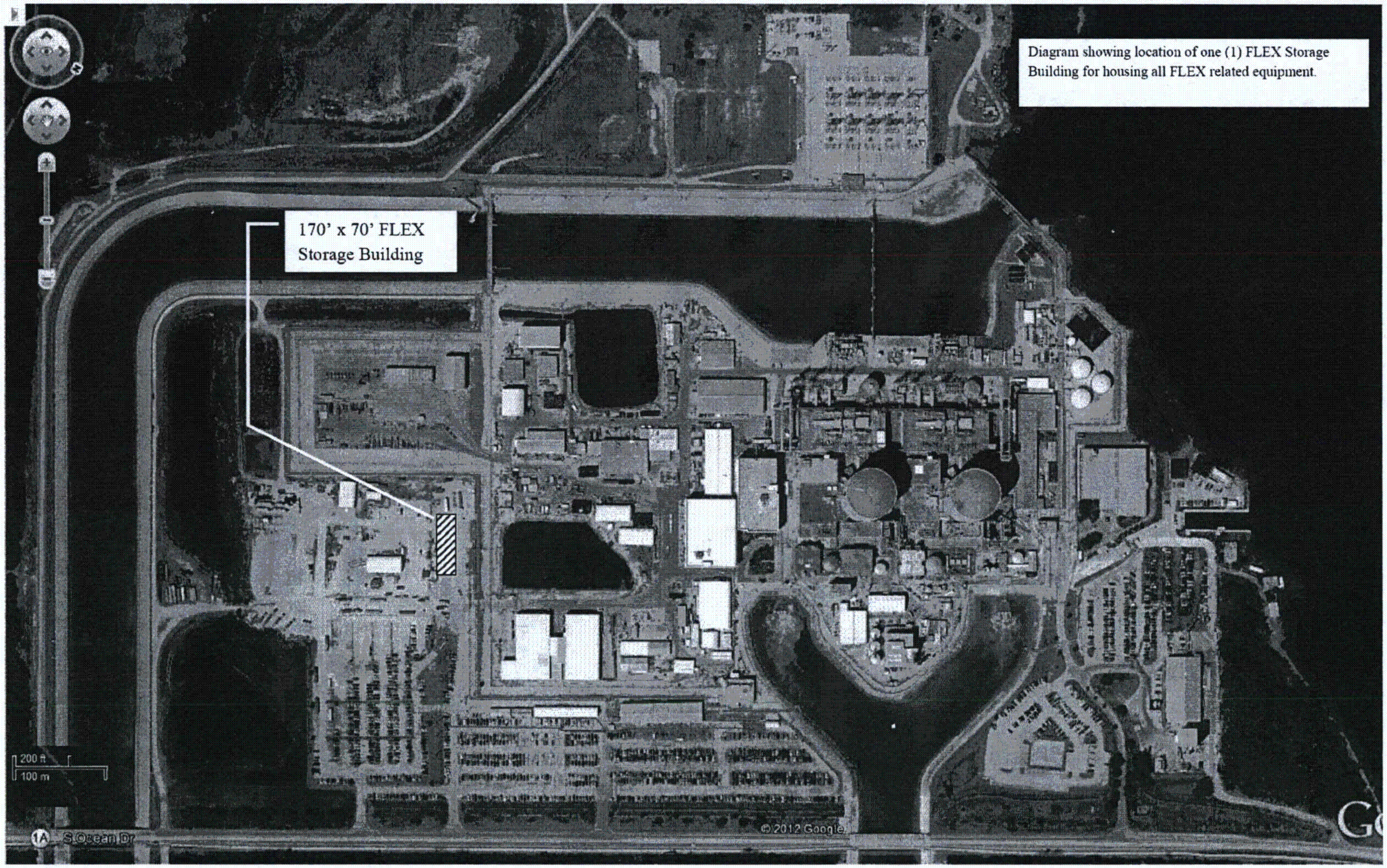


Figure 7 Proposed FLEX Equipment Storage Building (FESB) Location

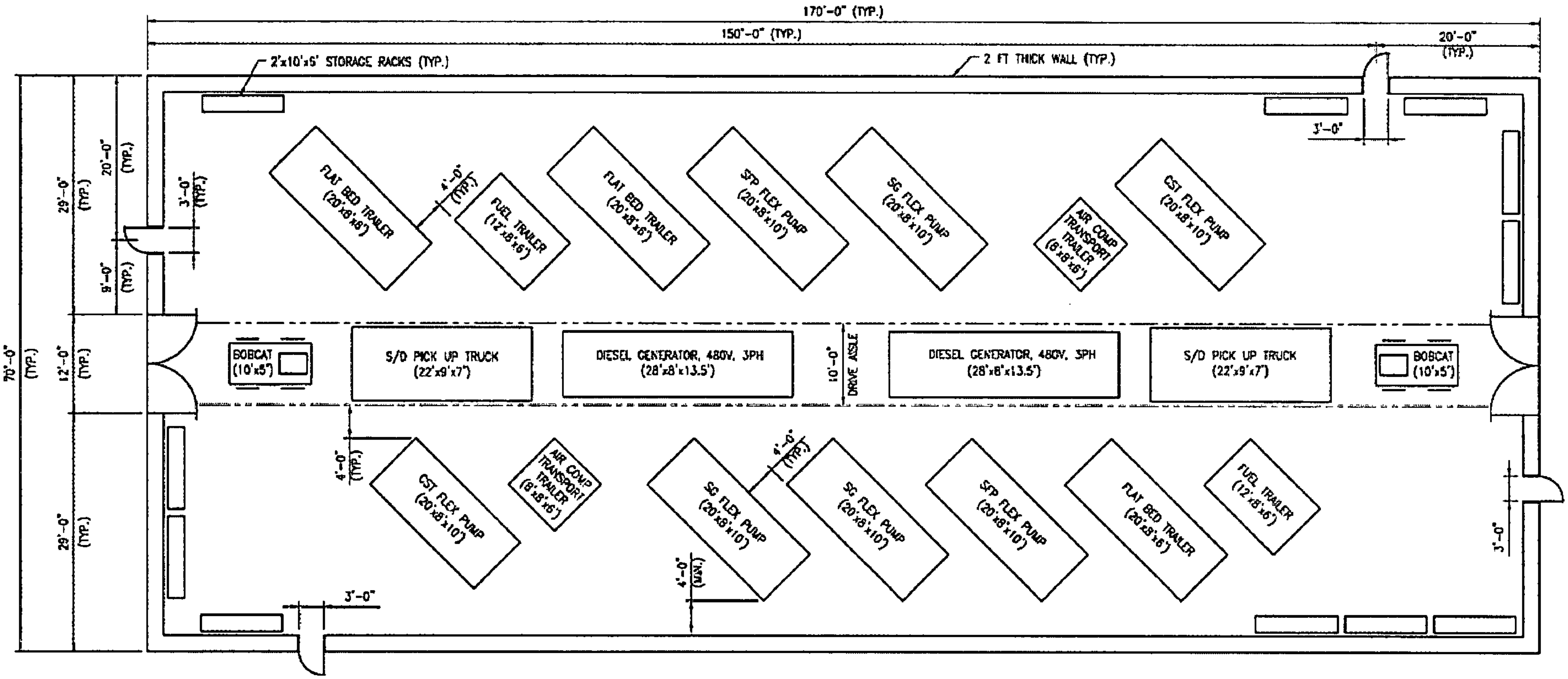


Figure 8 Proposed FLEX Equipment Storage Building (FESB) Layout

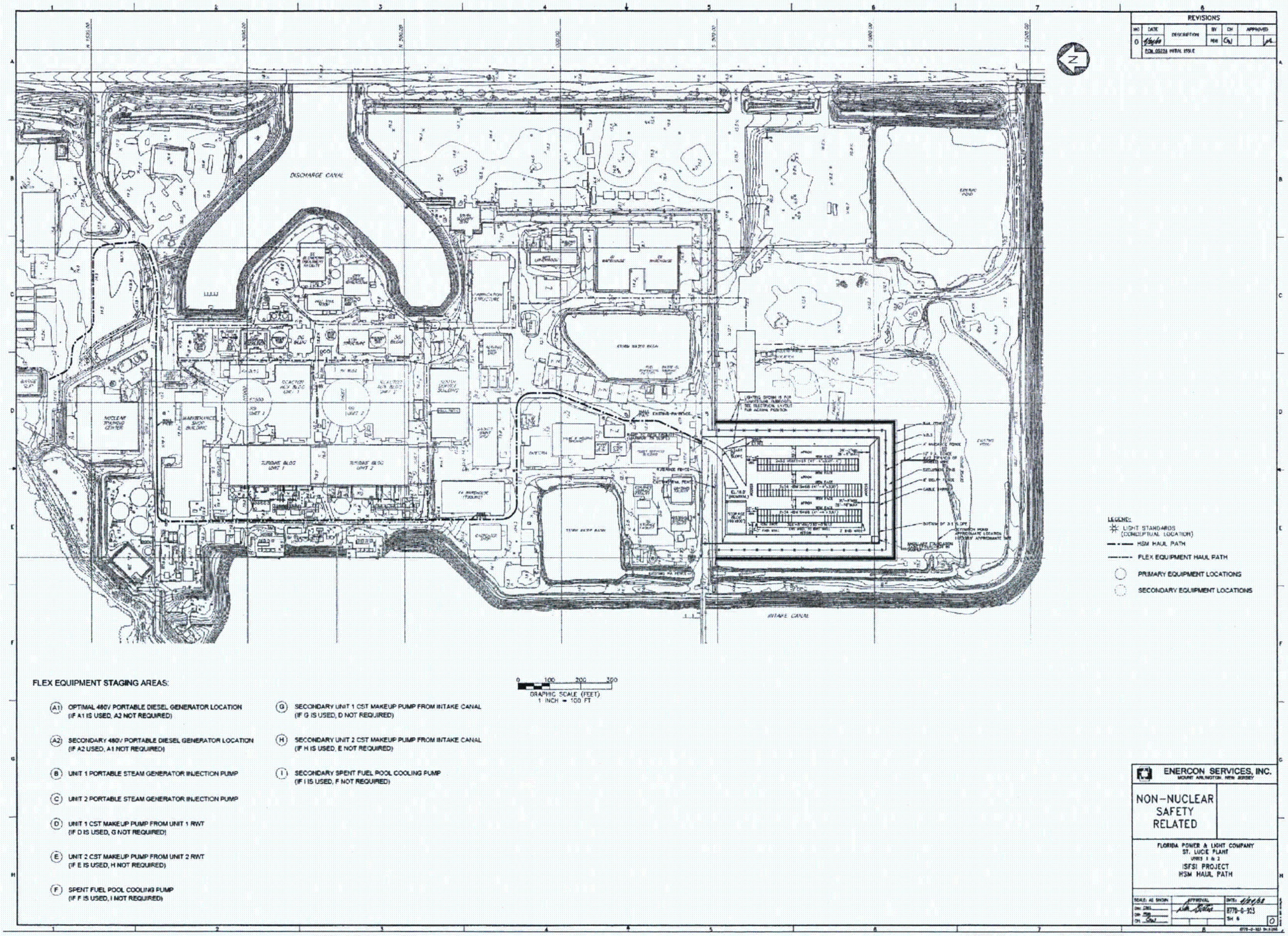


Figure 9 Proposed FLEX Equipment Storage Building (FESB) Deployment Paths

Install nitrogen bottles for pneumatic backup to Unit 1 ADVs in Unit 1 Steam Trestle. Install isolation valve with hose connection on ADVs. Store hose in Steam Trestle for final connection.

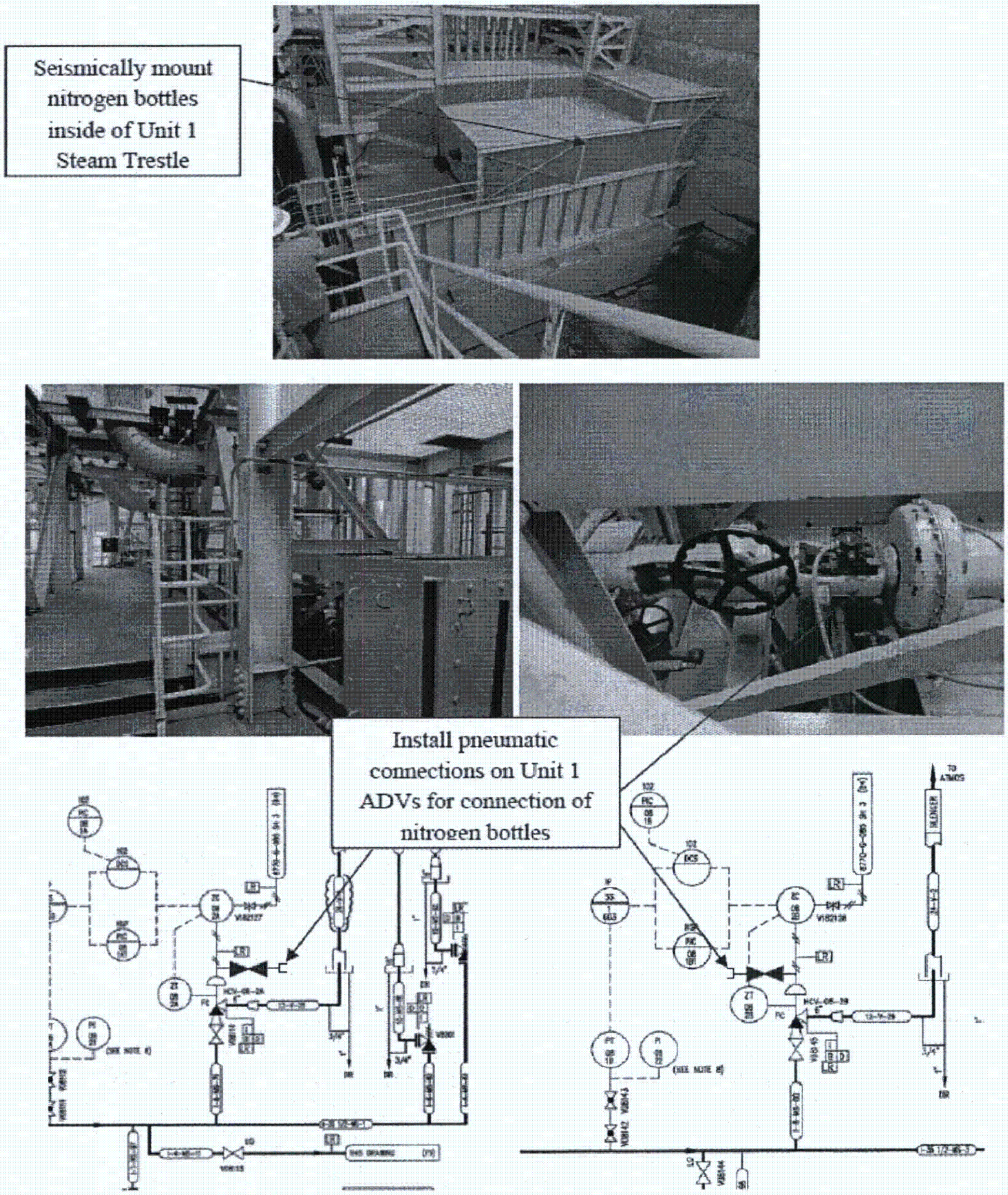
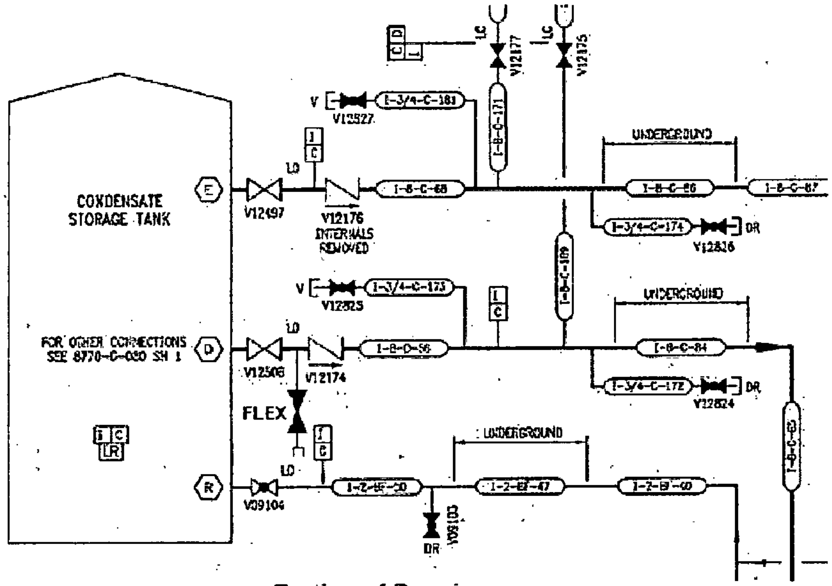


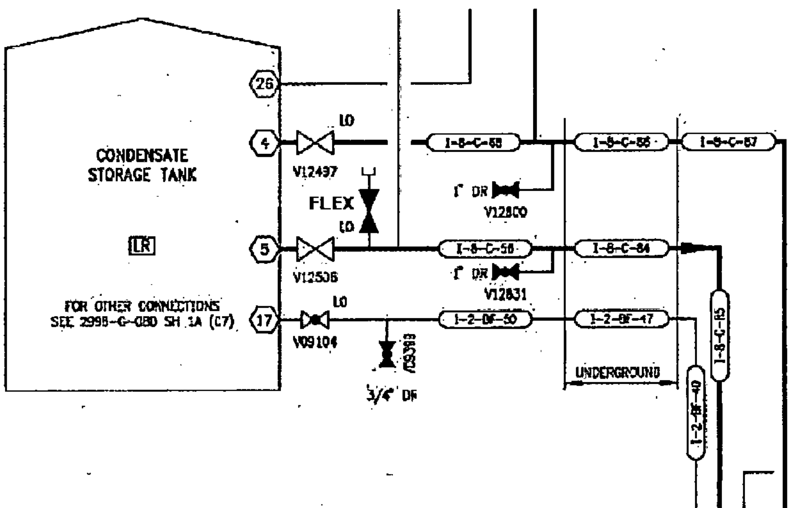
Figure 10 Proposed Design for Nitrogen Backup to Unit 1 ADVs

Install a 4" isolation valve and hose connection on Condensate Storage Tanks (CSTs) for suction to FLEX pumps.



Portion of Drawing

8770-G-080 Sh. 4

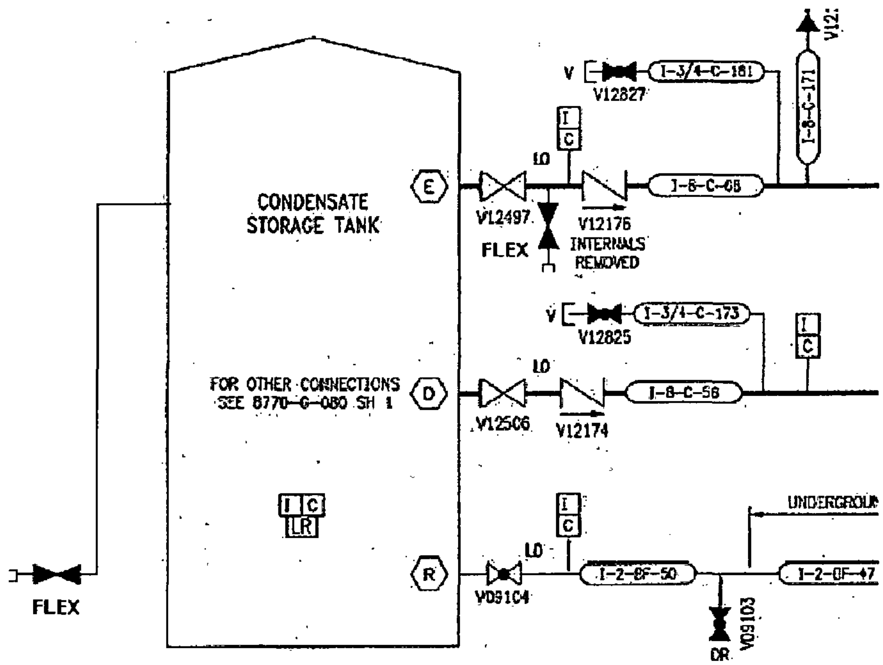


Portion of Drawing

2998-G-80 Sh. 2B

Figure 11 Connections for CST FLEX Pump Suction on CSTs

Install a 4" isolation valve and hose connection in a new tap on the CSTs provide makeup water.



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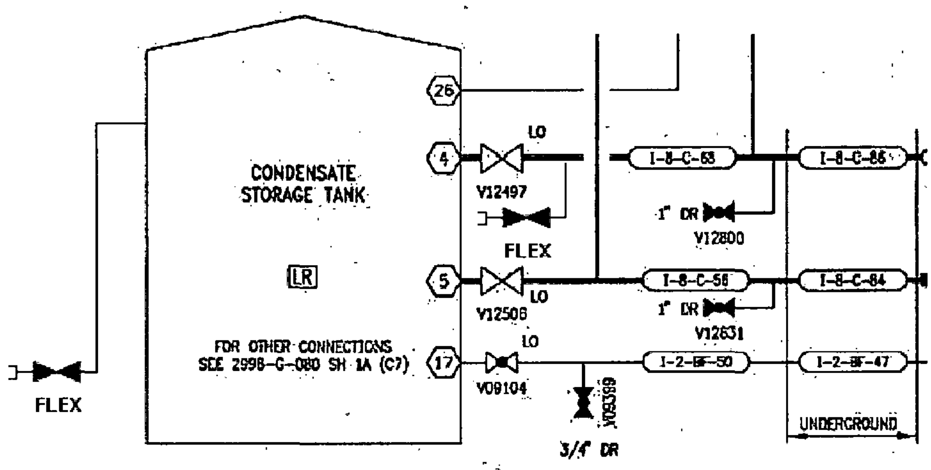
8770-G-080 Sh. 4

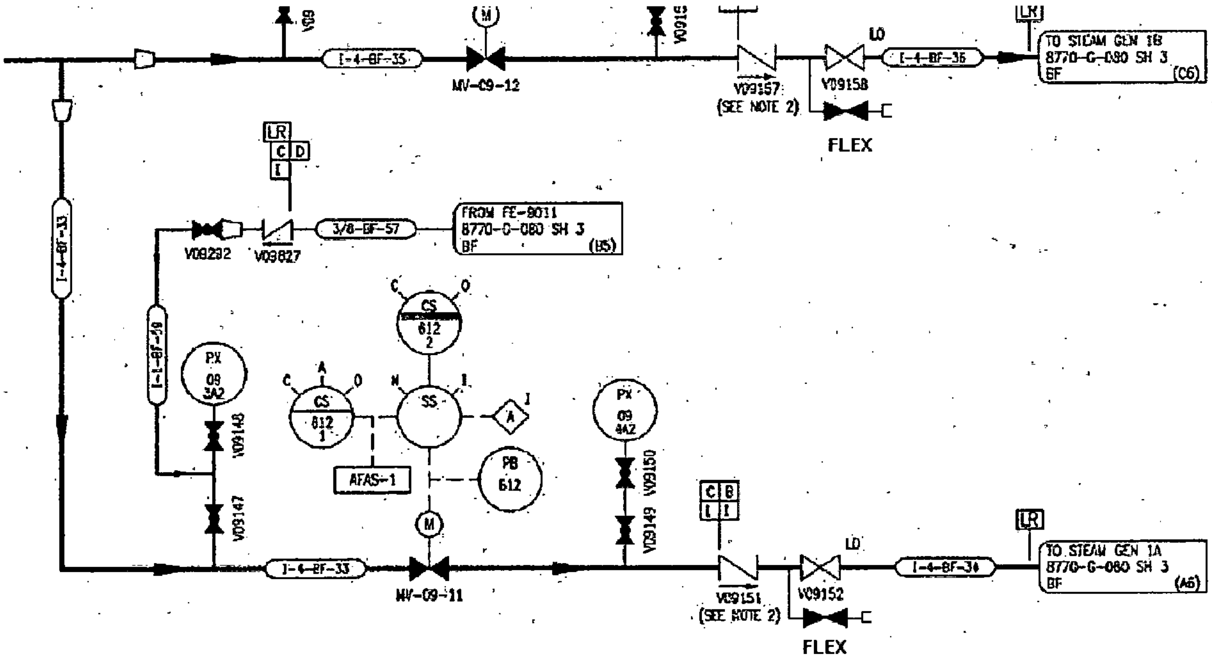


Portion of Drawing

2998-G-080 Sh. 2B

Figure 12 Connections for CST/SG FLEX Pump Discharge for CST Fill

Install a 4" isolation valve and hose connection to the AFW pump 1C(2C) discharge piping for Steam Generator Injection by using a FLEX pump.



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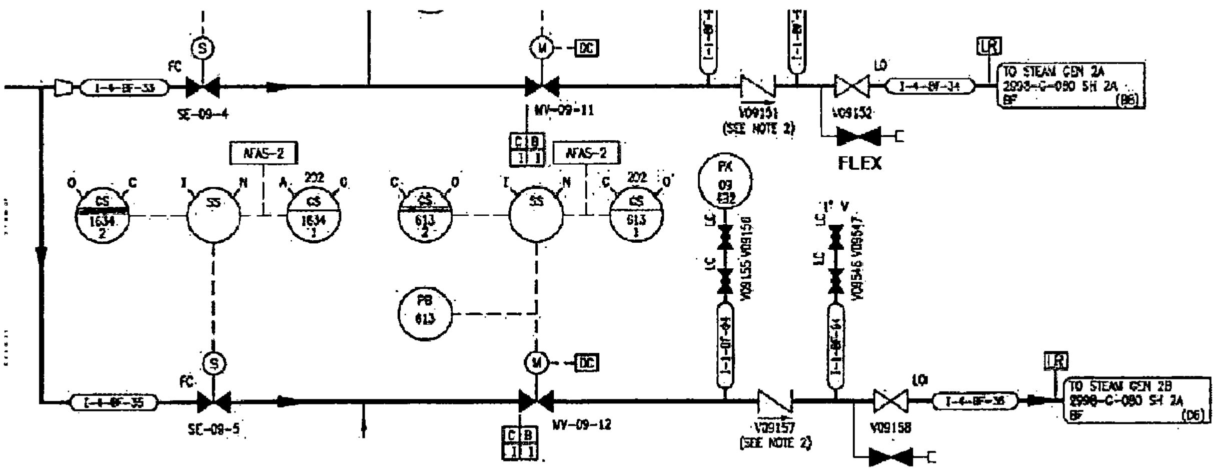
8770-G-080 Sh. 4

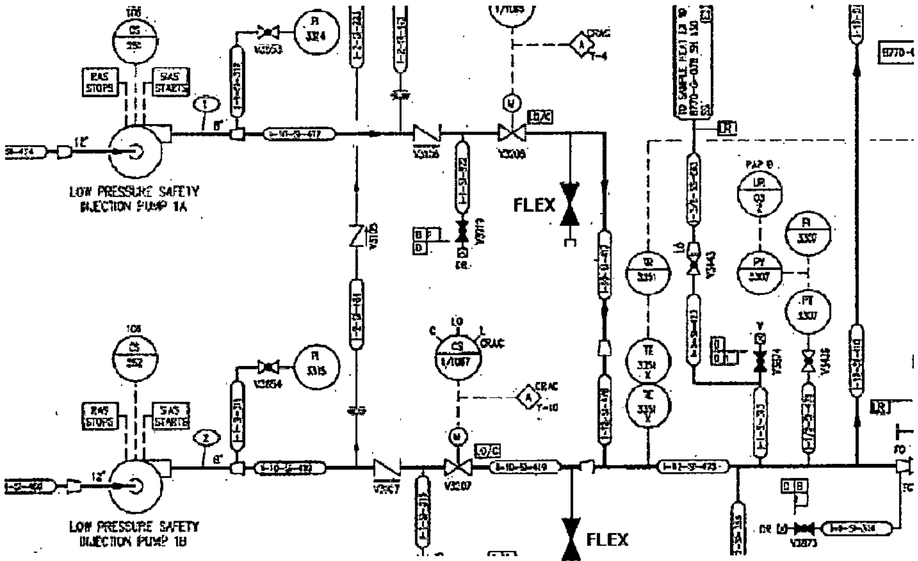


Portion of Drawing

2998-G-080 Sh. 2B

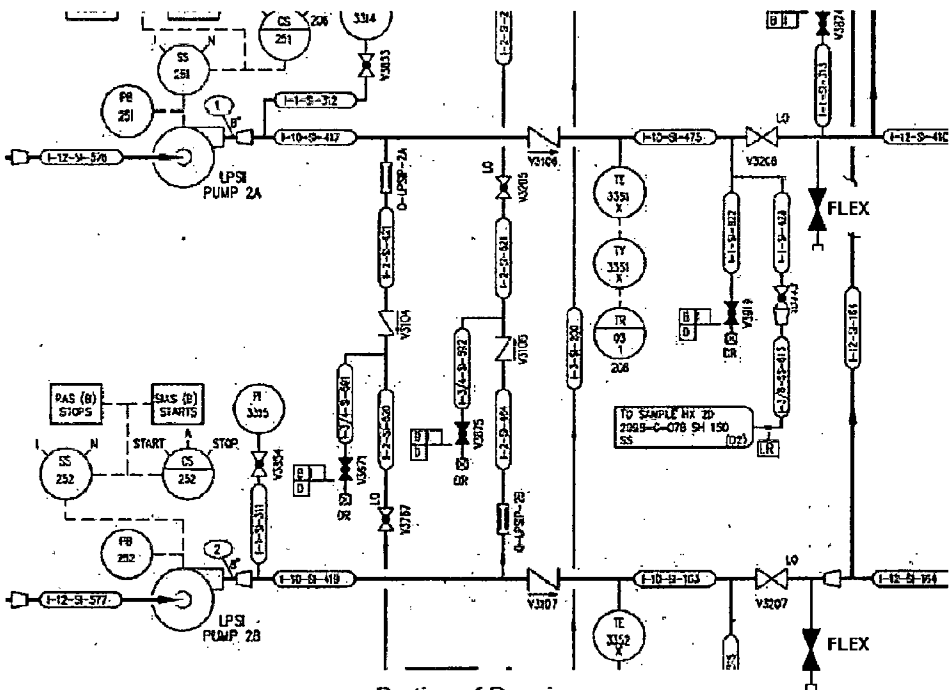
Figure 13 Connections for SG FLEX Pump Discharge to AFW Pump Discharge Lines

Install a 3" – 4" isolation valve and hose connection on the LPSI 1A/1B and LPSI 2A/2B discharge piping. For RCS cold leg injection with FLEX pump drawing suction from the RWT.



Portion of Drawing

8770-G-078 Sh. 130B



Portion of Drawing

2998-G-078 Sh. 130B

Figure 14 Connections for SG FLEX Pump Discharge to LPSI Pump Discharge Lines

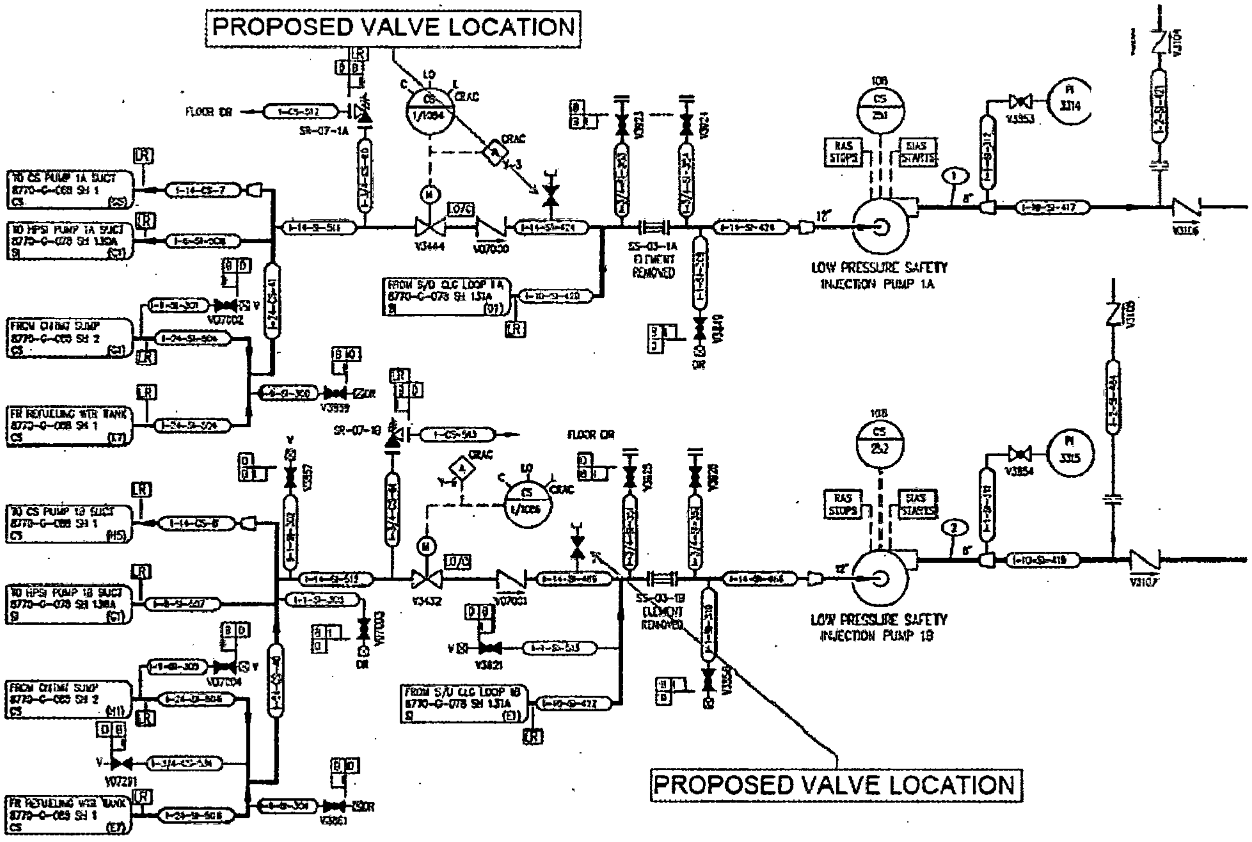


Figure 15 Connections for SG FLEX Pump to LPSI Pump Suction Lines (Unit 1, Unit 2 similar)

Missile protect lines I-2 ½-CW-178 located on the exterior of the Fuel Handling Building for each Unit to provide hardened makeup to the Spent Fuel Pools.

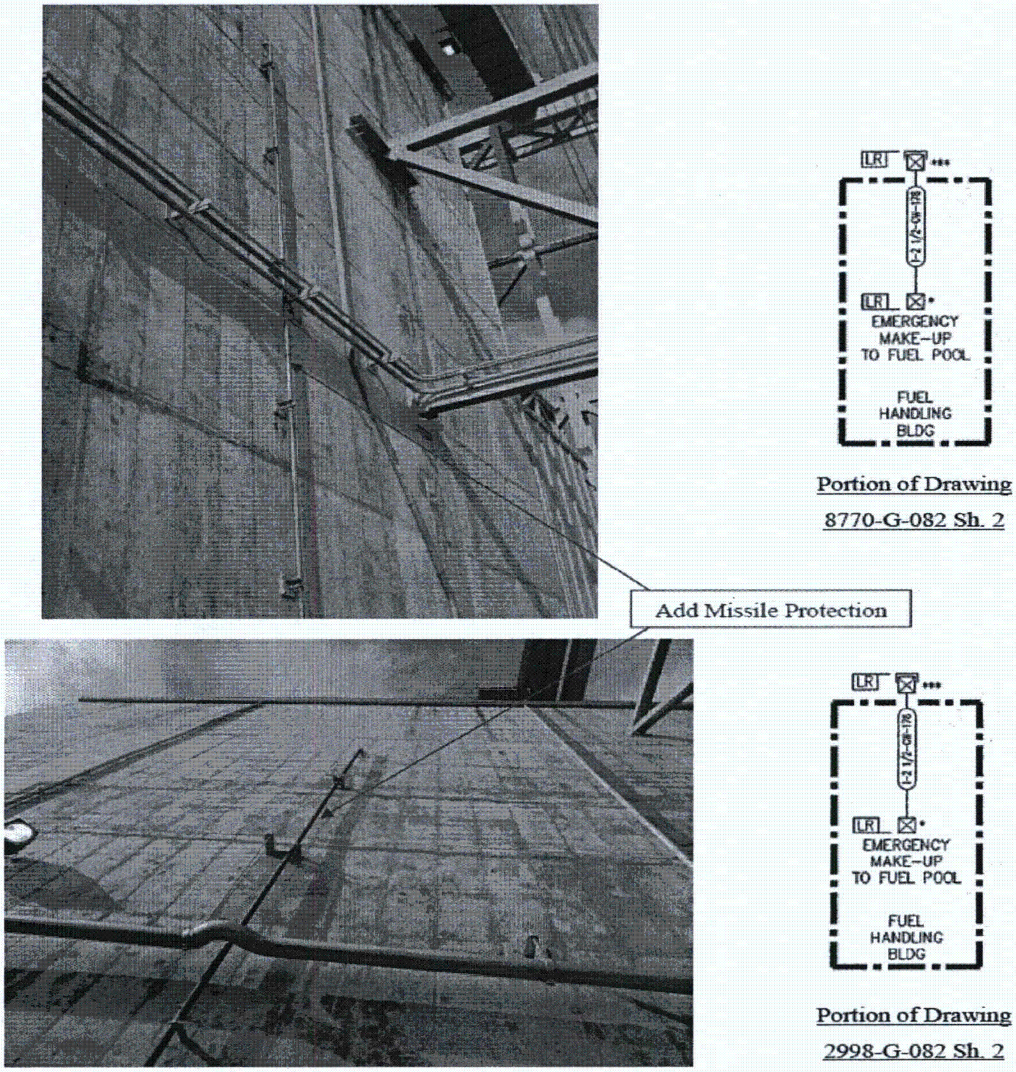


Figure 16 Hardened SFP Makeup Line

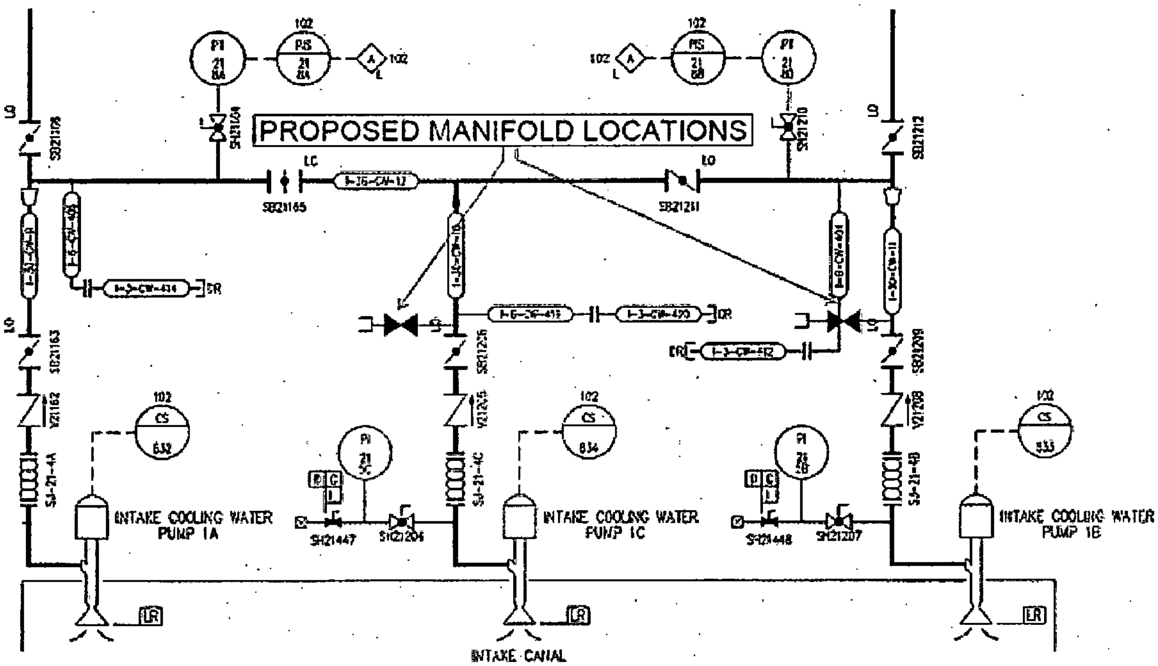


Figure 17 Connections for RRC LUHS Pumping System (Unit 1)

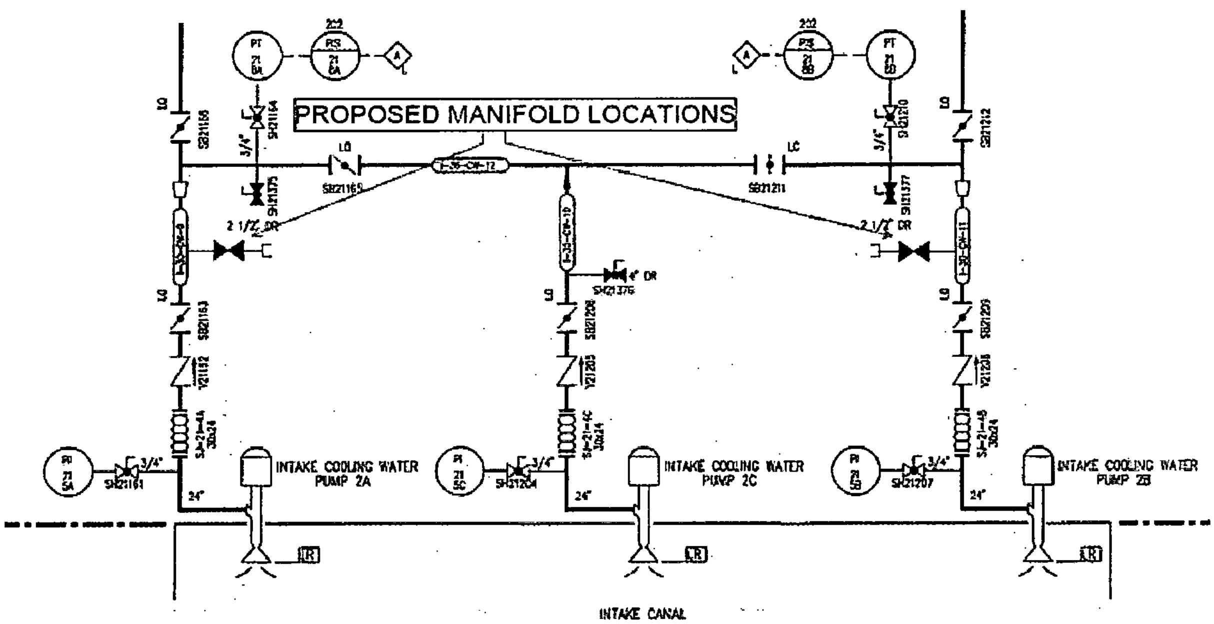


Figure 18 Connections for RRC LUHS Pumping System (Unit 2)

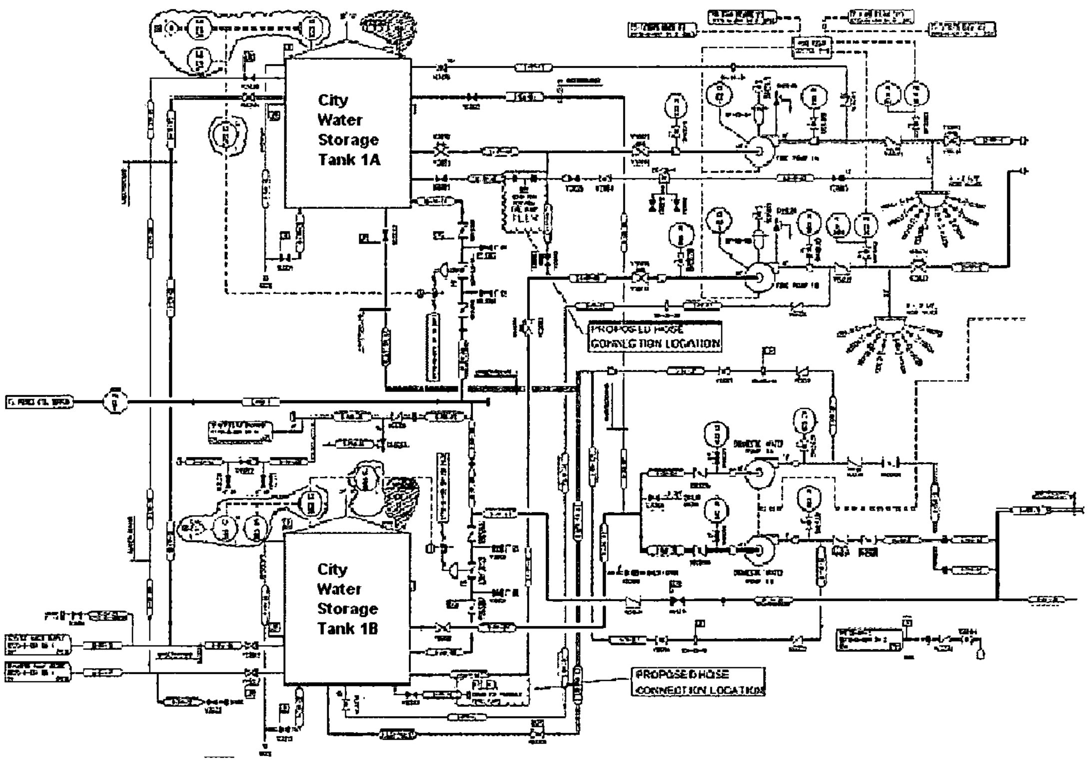


Figure 19 Connections for CST/SG FLEX Pump Suction From CWST

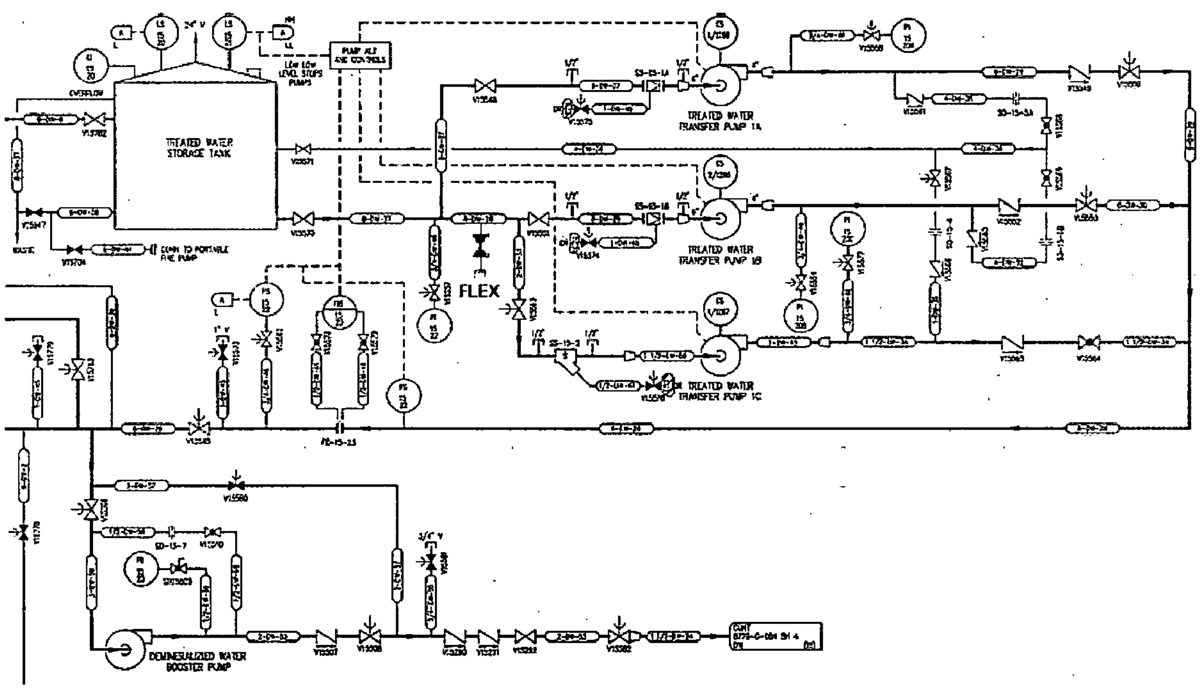


Figure 20 Connections for CST/SG FLEX Pump Suction From TWST

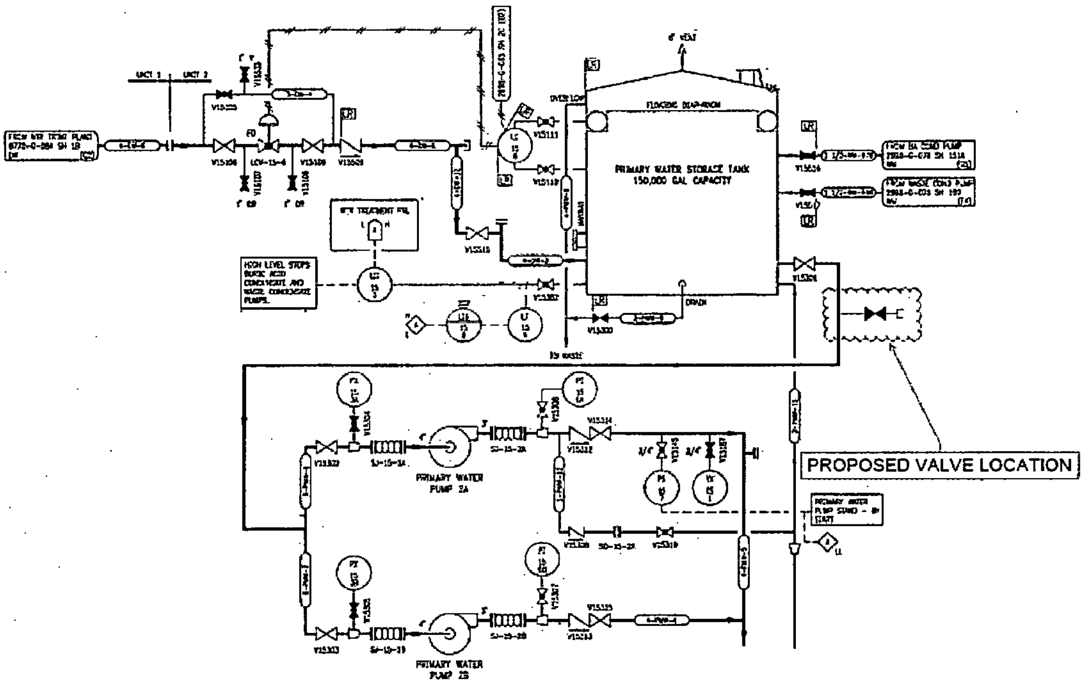


Figure 21 Connections for CST/SG FLEX Pump Suction From PWSTs (Unit 2, Unit 1 Similar)

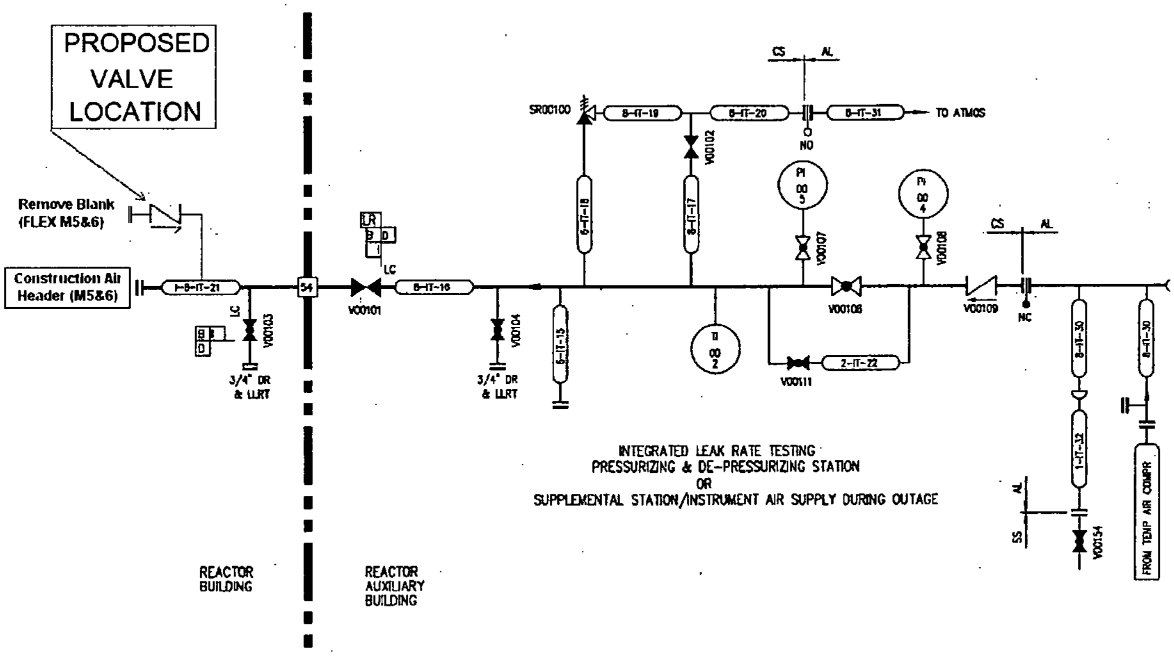


Figure 22 Proposed Design for Containment Venting (Unit 1)

Attachment 4
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5 ND Calc FPL064-CALC-001, Rev 1, Steam Generator FLEX Pump Sizing
6 ND Calc FPL064-CALC-002, Rev 0, Condensate Storage Tank FLEX Pump Sizing
7 ND Calc FPL064-CALC-003, Rev 0 MAAP Containment Analysis
8 ND Calc FPL064-CALC-004, Rev 0, Unit 1 Battery Load Shedding Strategy
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11 ND Calc FPL064-CALC-007, Rev 0, Electrical Equipment Rooms: 1A, 1B, and 1C Heat Up During an Extended Loss of Off-site Power
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15 ND Calc FPL064-CALC-011, Rev 1, ELAP Decay Heat and Makeup Requirements
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22 ND Design Basis Document DBD-CNTMT-2, Rev 3, Containment Systems
23 ND Design Basis Document DBD-HPSI-1, Rev 3, High Pressure Safety Injection System
24 ND Design Basis Document DBD-HPSI-2, Rev 3, High Pressure Safety Injection System
25 ND Drawing 2998-3147, Rev 2, RWT General Arrangement
26 ND Drawing 2998-9182 Rev 5, Condensate Storage Tank-Orientation
27 ND Drawing 2998-9184 Rev 3, Condensate Storage Tank-Field Notes & Fittings
28 ND Drawing 2998-9185 Rev 4, Condensate Storage General Plan
29 ND Drawing 2998-G-078, Sheet 132, Rev 11, Flow Diagram Safety Injection System
30 ND Drawing 2998-G-082, Sheet 2, Rev 56, Circulating & Intake Cooling Water System
31 ND Drawing 2998-G-172, Rev 21, Yard Piping
32 ND Drawing 8770-4544, Rev 3, RWT General Plan
33 ND Drawing 8770-4769, Rev 8, Condensate Storage Tank
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Attachment 5
Acronyms

ADV	Atmospheric Dump Valve
AFAS	Auxiliary Feedwater Actuation Signal
AFW	Auxiliary Feedwater
BAM	Boric Acid Makeup
BDBEE	Beyond Design Basis External Event
CBO	Controlled Bleed Off
CCW	Component Cooling Water
CET	Core Exit Thermocouple
CFC	Containment Fan Cooler
CFR	Code of Federal Regulations
CST	Condensate Storage Tank
CVCS	Chemical and Volume Control System
CWST	City Water Storage Tank
DBD	Design Basis Document
DC	Direct Current
DFO	Diesel Fuel Oil
DG	Diesel Generator (FLEX Equipment)
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EER	Electrical Equipment Room
ELAP	Extended Loss of AC Power
EOP	Emergency Operating Procedure
EQ	Environmental Qualifications
ERO	Emergency Response Organization
ESF	Engineered Safety Feature
FESB	FLEX Equipment Storage Building
FHB	Fuel Handling Building
FLEX	Diverse and Flexible Coping Strategies
FPL	Florida Power & Light Company/NextEra
FSG	FLEX Support Guidelines
HL	Hot Leg
HPSI	High Pressure Safety Injection
HX	Heat Exchanger
INPO	Institute of Nuclear Power Operations
ISFSI	Independent Spent Fuel Storage Installation
LI	Level Indicator
LIS	Level Indicating Switch
LOCA	Loss of Coolant Accident
LPSI	Low Pressure Safety Injection
LT	Level Transmitter
LUHS	Loss of Ultimate Heat Sink
MAAP	Modular Accident Analysis Program
MOV	Motor Operated Valve
MSSV	Main Steam Safety Valve
NC	Normally Closed
NEI	Nuclear Energy Institute
NO	Normally Open

NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
OTC	Once-Though-Cooling
PI	Pressure Indication
PMF	Probable Maximum Flood
PMH	Probable Maximum Hurricane
PSL	St. Lucie Plant
PSL1[2]	St. Lucie Unit 1[2]
PWR	Pressurized Water Reactor
PWROG	Pressurize Water Reactor Owners Group
PWST	Primary Water Storage Tank
RVLIS	Reactor Vessel Level Indication System
PZR	Pressurizer
QSPDS	Quality Safety Parameter Display System
RAB	Reactor Auxiliary Building
RAS	Recirculation Actuation Signal
RCB	Reactor Containment Building
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RRC	Regional Response Center
RV	Reactor Vessel
RWT	Refueling Water Tank
SAFER	Strategic Alliance for FLEX Emergency Response
SAMG	Severe Accident Management Guidelines
SAT	Systematic Approach to Training
SG	Steam Generator
TDAFW	Turbine Driven Auxiliary Feedwater (Pump)
TGB	Turbine Generator Building
TWST	Treated Water Storage Tank
WR	Wide Range
SBLOCA	Small Break Loss of Coolant Accident
SDC	Shutdown Cooling (Decay Heat Removal)
SFP	Spent Fuel Pool
SG	Steam Generator
SI	Safety Injection
SIAS	Safety Injection Actuation Signal
SIT	Safety Injection Tank
TS	Technical Specification(s)
U1	St. Lucie Unit 1
U2	St. Lucie Unit 2
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
UT	Ultrasonic Testing
VAC	Volts Alternating Current
VCT	Volume Control Tank
VDC	Volts Direct Current

Attachment 6
Pending Actions

Perform Evaluations/Analyses	
1	Seismic re-evaluation of site and submit to NRC Include insights in development of the FLEX integrated plan
2	Flooding re-evaluation of site and submit to NRC Include insights in development of the FLEX integrated plan
3	Establish location of RRC Staging Area (outside of 25 mile radius)
4	Review FESB deployment routes for liquefaction
5	Determine RRC staging area location and develop deployment routes to site
6	Review Communications adequacy during Phase 2 staffing study
7	Review Extend DC Shedding Approach regarding potential spurious actions
8	Determine alternate plant locations for obtaining critical parameters remotely
9	Review 480 VAC Diesel Generator FLEX Sizing
10	Review 4.16 KVAC Diesel Generator RRC FLEX Sizing
11	Analysis to maintain acceptable CR temperatures during ELAP, identify additional required strategies/ modifications
12	Review EER operation up to 129°F for 72 hours or provide portable fans, initiate FSG/Time Validation as required
13	Qualify U1 CST regarding tornado wind hazards, identify any required modifications
14	Qualify RWT(s) regarding tornado wind hazards, identify any required modifications
15	Review boron batching alternatives, determine approach, identify required modifications
16	Perform analysis supporting survivability of one or more non-qualified water tanks
17	Finalize boration requirements for Cold Shutdown Margin and timing of injection with electrical power availability. Ensure letdown flow is not required or provide modification to provide letdown. Update milestone as necessary.
18	Review boron precipitation during Phase 1&2 (pool boiling) and Phase 3 (final cooldown) for Mode 6&5 w/o SGs
19	Evaluate establishment of contract or letter of agreement for water supply by tanker trucks
20	Review M5 containment vent path (RWT gravity feed/Containment overpressure) Consider LCO 3.9.4, RAB/CR ventilation. Confirm adequacy of Unit 2 8" mini-purge line size.
21	Review potential modification for an 8" relief path to prevent U1 containment overpressure
22	Review safeguard equipment initiation with respect to M5 containment vacuum analysis
23	Review LUHS Pumping System RRC FLEX Sizing
24	Ensure FHB L-shaped door can be opened in the required time frame or identify alternate venting approach
25	Provide Technical Basis for WCAP-17601-P deviations to NRC during six month updates
Perform Time Validation Studies for Deployments	
26	Time validation study for completing DC load shedding within specified time period
27	Time validation study for Control Room ventilation
28	Time validation study for Battery Room ventilation
29	Time validation study for Electrical Equipment Room ventilation
30	Time validation study for FHB ventilation and the deployment and staging of SFP makeup/spray capability
31	Time validation study for 480 VAC diesel generator to the station 480 VAC bus or directly to designated equipment
32	Time validation study for CST non-seismic lines isolation, as required by design
33	Time validation study for CST cross-connect
34	Time validation study for CST FLEX pump deployment
35	Time validation study for SG FLEX pumps for CST/AFW
36	Time validation study for boration to establish Cold Shutdown Margin (M1-4 w/SGs)
37	Time validation study for establishing power to SIT MOVs to isolate
38	Time validation study for establishing RWT gravity flow path to RCS (include mid-loop conditions)
39	Time validation study for SG FLEX pump for RWT/RCS
40	Time validation study for batch boration to maintain borated water supply (M6 & 5 w/o SGs)
41	Time validation study for venting containment in mid-loop conditions
42	Time validation study for isolating Fuel Transfer Tube path.
43	Time validation study for establishing containment vent path.
44	Time validation study for isolating CCW Flow to Containment Fan Cooler Penetrations
45	Time validation study for hoses for SFP makeup and sprays in Phase 1
46	Time validation study for SFP FLEX pump
47	Time validation study for refueling FLEX equipment

Perform Modifications		
48	U1 & U2	Construct FLEX Equipment Storage Building Storage Building
49	U1 & U2	Install external satellite phone antenna and docking stations for TSC & EOF
50	U1 & U2	Install new cabling with disconnects for MCC supplying battery chargers. Alternate connections line side
51	U1 & U2	Change essential instrumentation source to vital 120VAC power panel
52	U1 & U2	Install transfer switch cabling to Class 1E 480 VAC Switchgear for connection of 480 VAC FLEX DG
53	U1 & U2	Install transfer switches on load side charging pumps and Class 1E battery chargers. Alternate connection.
54	U1 & U2	Install cabling/disconnects for Class 1E 4.16 KVAC busses A&B
55	U1 & U2	Install RCP low leakage seals
56	U1	Install ADV seismic pneumatic backup and air pressure regulator, provide quick connects
57	U1	Install modifications for CST as required by tornado wind hazard analysis
58	U1 & U2	Qualify non-seismic lines penetrating CSTs or use another approach to qualify additional CST inventory
59	U1 & U2	Qualify non-seismic CST cross-connect
60	U1 & U2	Install 2 connections per CST for refilling the CSTs via CST FLEX pump
61	U1 & U2	Install 2 connections per CST for suction point for SG FLEX pump
62	U1 & U2	Install 2 connections on AFW lines downstream of MV-09-11 and MV-09-12 for SG FLEX pump
63	U1 & U2	Install single connections for taking suction on non-qualified tanks
64	U1 & U2	Install modifications for RWT as required by tornado wind hazard analyses
65	U1 & U2	Install RWT cross-connect sized for gravity fill as required by tornado wind hazard analyses
66	U1 & U2	Install 2 connections per RWT for suction point for SG FLEX pump/CST FLEX Pump
67	U1 & U2	Install 2 connections per RWT for CST FLEX pump discharge
68	U1 & U2	Install 2 connections on LPSI pump discharge piping for RCS cold leg injection via FLEX pump
69	U1 & U2	Install 2 connections on LPSI pump suction piping (Mode 6 with Rx head off/SG primary manways off)
70	U1	Provide containment vent path to ensure sufficient RWT gravity flow for RCS makeup
71	U1 & U2	Missile protect ICW line I-2 ½-CW-178 located on the exterior of U1 & U2 FHBs
72	U1 & U2	Install ICW manifolds with hose connections and isolation valves for LUHS
Perform FSG Development / Procedure Revisions		
73		New procedure for use of Satellite communications
74		FSG: Establishing FLEX Control Room Ventilation
75		FSG: Extended DC bus load shedding or revise EOP-99
76		FSG: Damage assessment following event
77		FSG: Accessibility considerations for personnel to enter areas to perform local manual actions
78		FSG: Deployment and staging of portable equipment (Onsite and Offsite)
79		FSG: Operation of the FLEX equipment (startup, shutdown, operational monitoring, minor troubleshooting
80		FSG: Operation of DFO transfueler, filling from U2 DFO tanks, filling FLEX portable equipment, etc
81		FSG: Restore AC power or alternate power sources for specific plant equipment
82		FSG: Lighting and communications necessary for ingress and egress to plant areas for deployment of FLEX strategies
83		FSG: Deployment and operation of 480 VAC diesel generator
84		FSG: Power restoration with ESF signals present due to de-energized instrument inverters
85		FSG: Repowering selected station loads to support long term safety functions (load management)
86		FSG: Operation of ADVs with backup compressed gas
87		FSG: Deployment and operation of CST FLEX pump
88		FSG: Maintaining flow to SGs, with identified backup sources and criteria for transferring between sources
89		FSG: Deployment and operation of SG FLEX pump
90		FSG/EOP-10 to address for FLEX RCS cooldown (cooldown, solid plant conditions, SIT isolation, Attach 1B)
91		FSG: Guidance for SIT injection and isolation
92		FSG: Establish RWT gravity flow to RCS and criteria for transfer to SG FLEX pump
93		FSG: Guidance for boron mixing
94		FSG: Deployment and operation of SFP FLEX pump
95		FSG: Guidance for isolation of CCW penetrations for CFC Coolers
96		FSG: Guidance for venting containment in M5/6 Once-Through-Cooling with LUHS (include CS Lockout)
97		FSG: Deployment and operation of RRC 4.16 KVAC generator
98		FSG: Deployment and operation of RRC pumping system for ICW
99		FSG: Deployment and operation of SG FLEX pump: injection for vapor bound LPSI pump
100		Implement a FLEX program stipulating the required administrative controls to be implemented