NEXTera ENERGY SEABROOK

February 26, 2013
SBK-L-13038
Docket No. 50-443

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

Seabrook Station

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. NextEra Energy Seabrook Letter, SBK-L-12212, Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated October 26, 2012, Accession No. ML12311A013.

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to NextEra Energy Seabrook, LLC (NextEra Energy Seabrook) Reference 1 was immediately effective and directs NextEra Energy Seabrook 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.

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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 NextEra Energy Seabrook initial status report regarding mitigation strategies, as required by Reference 1.

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

The information in the enclosure provides the NextEra Energy Seabrook 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.

Should you have any questions regarding this letter, please contact Mr. Michael O'Keefe, Licensing Manager, at (603) 773-7745.

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

Executed on FEBRUARY 26, 2013.

Sincerely,

Kevin T. Walsh
Site Vice President
NextEra Energy Seabrook, LLC

cc: NRC Region I Administrator
J. G. Lamb, NRC Project Manager, Project Directorate I-2
NRC Senior Resident Inspector
Director, Office of Nuclear Reactor Regulation
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
Mr. Eric E. Bowman, NRR/DPR/PGCB

Enclosure

Seabrook Station - Strategic Integrated Plan for Order EA-12-049

General Integrated Plan Elements - PWR	
Determine Applicable Extreme External Hazards **Ref: NEI 12-06 section 4.0 - 9.0** **JLD-ISG-2012-01 section 1.0**	Seabrook Station is a 4-loop Westinghouse Pressurized Water Reactor located on the New Hampshire seacoast at 70 degrees, 51 minutes, 05 seconds west longitude; 42 degrees, 53 minutes, 53 seconds north latitude. Seabrook Station 'screens in' for the following external hazards as defined in Sections 4 through 9 of NEI 12-06 [Ref. 1 - See Attachment 6 for a List of References]: • Seismic events • External flooding events • High wind events with the potential for wind-driven missiles from hurricanes and tornados • Snow, ice, and extreme cold events <u>Seismic event design basis:</u> The licensing basis for Seismic Category I (SC-1) equipment at Seabrook Station is defined in Updated Final Safety Analysis Report (UFSAR), Section 3.7(B). Site design ground motion response spectra for the Safe Shutdown Earthquake (SSE) are provided in UFSAR Figures 3.7(B)-1, 3.7(B)-2, and 3.7(B)-3 and adhere to Regulatory Guide 1.60, '*Design Response Spectra for Seismic Design of Nuclear Power Plants*'. Damping values for SC-1 equipment are listed in UFSAR Table 3.7(B)-1 and conform to Regulatory Guide 1.61, '*Damping Values for Seismic Design of Nuclear Power Plants*'. As defined in UFSAR Section 2.5, the SSE is based on the postulated occurrence of a magnitude VIII(MM) earthquake located at the site. The horizontal peak acceleration associated with the maximum earthquake potential intensity according to the intensity-acceleration relationship established by Trifunac and Brady (1975) is 0.25g (mean plus one sigma). Assuming that the vertical peak acceleration is two-thirds of the horizontal acceleration (Newmark and Hall, 1977), 0.167g is selected accordingly [Ref. 2].

	Flooding event design basis: The Current Licensing Basis for Flood Protection for Seabrook Station includes the ability to withstand the effects of a combined Standard Project Storm (SPS) and Probable Maximum Hurricane (PMH). It also must consider the effects of wave run-up during the SPS / PMH storm. Site grade is at elevation 20 feet Mean Sea Level (MSL) and the anticipated elevation of flood water (ponding) during the SPS / PMH storm is 20.6 feet MSL. Wave run-up that can accompany the combined SPS / PMH is estimated to achieve an elevation of 21.8 feet Mean Sea Level (MSL) on the east and south walls of specific site buildings for a short duration of approximately 1-2 hours [Ref. 2]. High wind event design basis: Seabrook is a coastal site and is subject to high wind hazards. Seabrook Station is situated near the 160 mph hurricane contour shown in Figure 7-1 of NEI 12-06. NEI 12-06 Figure 7-2 shows Seabrook to be in Region 2 with a recommended tornado wind speed of 170 mph. High winds and tornado loadings are discussed in Seabrook Station UFSAR Chapter 3, Section 3.3, 'Wind and Tornado Loadings'. Per UFSAR Section 3.3.1.1, the design wind velocity is 110 mph. Wind loads are applied to all seismic Class 1 structures based on this design wind speed. UFSAR Section 3.3.2 states that the design tornado has a maximum wind velocity of 360 mph (horizontal rotational wind speed of 290 mph plus translational speed of 70 mph). The design tornado applied to Seabrook is conservative as NUREG/CR-4461 Rev. 2, Table 6-1, on which NEI 12-06 Figure 7-2 is based, lists Seabrook possible tornado wind speeds from 143 mph to 254 mph depending on the probability level used. Additionally, tornados in coastal New England are extremely rare and of much lower severity than assumed in the UFSAR [Ref. 2]. Snow, ice, and extreme cold events: Seabrook Station UFSAR Section 2.3.2, 'Local Meteorology', notes that extremes of temperature are uncommon due to the proximity of the site to the Atlantic Ocean. Winter arctic air masses can produce low minimum temperatures, but the frequency and persistence of such extreme values along the coast is less than inland locations.

	UFSAR Section 2.3.1 notes that the Seabrook site is subjected not only to storms that track across the continental United States, but also to intense winter storms, (i.e., "Nor' easters,") that move northeastward along the U.S. East coast. During the winter months Nor'easters can produce heavy rain or snowfall, and occasionally bring ice storm conditions to the area. Nor'easter winds are typically less severe than those of postulated hurricanes. Seabrook structures are designed for snow and ice loads [Ref. 2]. Extreme high temperature events: Seabrook Station 'screens out' of the extreme high temperature hazard based upon the following information: • Contrary to the assertion in Section 9 of NEI 12-06 that "virtually all of the 48 contiguous states have experienced temperatures in excess of 110°F", the record high temperature for the State of New Hampshire is 106°F which was recorded in Nashua, NH in 1911*. Nashua is located in the western part of the state away from the coast. • Seabrook UFSAR Section 2.3.2, 'Local Meteorology', notes that extremes of temperature are uncommon due to the proximity of the site to the Atlantic Ocean. During the spring and summer a sea breeze usually moderates temperatures from reaching high extremes at the site. • The highest recorded temperature for Portsmouth, NH which is located on the seacoast 15 miles north of Seabrook Station is 101°F which occurred in both 1964 and 2011*. • The highest average maximum temperatures in Portsmouth, NH during the Summer months of June, July and August from 1960 to 2012 are*: - June: 80.8°F (1999) - July: 83.5°F (1994) - August: 83.7°F (2002) *NOAA/National Weather Service historical data for the State of New Hampshire.
Key Site assumptions to implement NEI 12-06 strategies.	• Seabrook assumes the General Criteria and Baseline Assumptions delineated in Section 3.2.1 of NEI 12-06. • Off-site resources (personnel, equipment, etc.) are

Ref: NEI 12-06 section 3.2.1	assumed to begin arriving at hour 6. Full Emergency Response Organization (ERO) staff augmentation, plus additional off-site personnel and other resources required to respond to the event, are assumed to be on site by 24 hours into the event. • This plan defines strategies capable of mitigating a simultaneous loss of all alternating current power and loss of normal access to the ultimate heat sink resulting from a Beyond-Design-Basis External Event (BDBEE) by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities. 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 Seabrook's emergency operating procedures (EOPs) in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit will be evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal plant 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 BDBEE 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. 36]. • Spent fuel in dry cask storage is outside the scope of NRC Order EA-12-049 and therefore is not addressed in Seabrook's response strategies. • Requested portable equipment from the Regional Response Centers (RRCs) is assumed to arrive on site at, or prior to, the 24 hour point in the event for air-liftable equipment, and at the 24-72 hour point for larger equipment that must be delivered via ground transportation. • As stated in Section 2 of NEI 12-06, "Each plant has unique features and for this reason, the implementation of FLEX capabilities will be site-specific". The unique features of Seabrook Station assumed available for the event response described in this report are:

	1. The Supplemental Emergency Power System (SEPS) [Ref. 3]. See Attachment 8 for a technical description of SEPS. 2. The Service Water System Cooling Tower [Ref. 4]. See Attachment 8 for a technical description of the Service Water System Cooling Tower.
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**	Full compliance with JLD-ISG-2012-01 [Ref. 6] and NEI 12-06 is expected. Where there are interpretations of NEI-12-06 or NRC Interim Staff Guidance requirements, Seabrook Station will follow those interpretations jointly developed by the NRC and NEI.
Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7 JLD-ISG-2012-01 section 2.1**	See Attachment 1A for the Sequence of Events (SOE) timeline. <u>SOE time constrained action:</u> Refueling of the SEPS gensets is identified as a time constrained action in the SOE timeline from 36-48 hours into the event. Each SEPS genset has a 6050 gallon fuel oil storage tank. Based on actual measurement from SEPS surveillance testing [Ref. 35] , the fuel consumption rate for each generator at rated load is approximately 167 gallons per hour. Seabrook Technical Requirement TR-31-3.1 [Ref. 7] specifies a minimum SEPS fuel oil tank level corresponding to 4775 gallons. Assuming that SEPS fuel level is at the TR-31-3.1 required minimum level at the time of the Extended Loss of AC Power (ELAP) event, each genset can power ELAP loads for greater than 28 hours. SEPS fuel tank levels are typically maintained in excess of 5000 gallons [Ref. 32], which increases expected run time to greater than 30 hours. Therefore, a SEPS total runtime of approximately 60 hours at rated load on the self-contained fuel supply is estimated for powering the ELAP loads on a 4.16 KV Emergency Bus. It is anticipated that the operating crew will evaluate refueling strategies for SEPS relatively early in the event. This action should not be delayed past 36 hours to allow

	adequate time for strategy implementation. Seabrook's primary refueling strategy will be to establish a contract with a fuel supplier that is outside of a minimum 25 mile radius from the plant. This contract will mandate delivery of diesel fuel to the site within 48 hours when requested following a BDBEE. As an alternate / backup strategy, Seabrook will develop a method for refueling SEPS from available on-site fuel resources. As described later in this report there are several on-site sources of diesel fuel. The supply that can be assumed to survive the BDBEE is contained in the fuel oil storage tanks for the Emergency Diesel Generators (EDGs). These 75,000 gallon tanks are located below grade in the seismic Cat-1 Emergency Diesel Generator Building (see Figure 5 in Attachment 3). Seabrook Technical Specification 3.8.1.1 requires a minimum of 62,000 gallons of fuel in each fuel oil storage tank. Seabrook will develop a method of transferring fuel from the EDG fuel oil storage tanks to SEPS using a portable refueling trailer similar to the one shown in Figure 6 of Attachment 3. The empty refueling trailer will be stored in the seismic Cat-1 Service Water Pumphouse.
Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	The strategies described in this report can be implemented in all Modes of plant operation because either 4.16 KV Emergency Bus can be re-powered using pre-deployed FLEX equipment (i.e., SEPS) vice requiring the physical deployment of portable equipment. The information in this report primarily addresses mitigating actions for an ELAP event that occurs when the plant is in Modes 1 through 4. Consequently, event response would be directed by actions prescribed in existing Emergency Operating Procedures (EOPs) and the Station Emergency Plan Implementing Procedures (EPIPs). Should the ELAP event occur with the plant in Modes 5 or 6, the EOPs would not be applicable and the operating crew would implement the actions of Abnormal Operating Procedure OS1246.01, 'Loss of Offsite Power - Plant Shutdown' [Ref. 8]. The SEPS gensets will be used to re-power a 4.16 KV Emergency Bus and core cooling will be

	re-established using a Residual Heat Removal (RHR) pump. During Mode 6 refueling operations most of the water from the Refueling Water Storage Tank (RWST) is contained in the cavity above the reactor and in the refueling canal. In this condition the gate between the fuel transfer canal and the Spent Fuel Pool (SFP) is typically open. SFP time to boil is highly dependent upon the number of freshly off-loaded assemblies contained in the pool. The strategies described in this report will re-power an Emergency Bus early in the event. This supports restoration of RHR cooling flow for the core and spent fuel pool cooling system flow for the SFP. Consequently, SFP temperature is not expected to approach saturation conditions. Mode 6 mid-loop operations, if scheduled during a refueling outage, are typically of short duration. While the likelihood of a BDBEE occurring during mid-loop operations is extremely remote, OS1246.01 directs the operating crew to implement OS1213.02, 'Loss of RHR While Operating at Reduced Inventory or Mid-loop Conditions' [Ref. 9]. This procedure directs the operating crew to gravity feed the Reactor Coolant System (ECS) from the RWST if power is not available to an RHR pump. However, as described later in this report, RHR pump operation can be restored as SEPS is providing power to an Emergency Bus. With the reactor in a de-fueled state (i.e., entire core is in the Spent Fuel Pool) the SFP time to boil is significantly reduced (approximately 4-5 hours). Consequently, it is important to restore SFP cooling flow once power has been restored to an Emergency Bus from SEPS. OS1246.01 should be revised to address loss of offsite power with the reactor de-fueled.
Provide a milestone schedule. This schedule should include: • **Modifications timeline** – **Phase 1 Modifications** – **Phase 2 Modifications** – **Phase 3 Modifications** • **Procedure guidance development complete** – **Strategies** – **Maintenance** • **Storage plan (reasonable protection)**	See Attachment 2 for Seabrook Station's Milestone Implementation Schedule.

• Staffing analysis 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	Surveillance testing procedures and Preventative Maintenance actions (PMs) already exist for the SEPS gensets and the Service Water Cooling Tower and associated safety-related equipment (see Attachment 4). As previously described, an alternate refueling strategy for the SEPS gensets using a portable refueling trailer will be developed. Preventative Maintenance (PM) actions and equipment testing requirements and frequencies will be developed for FLEX portable equipment using existing plant maintenance programs and will be based upon manufacturer recommendations. The control and scheduling of PM actions will be administered under the existing site work control processes.
Describe training plan	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 strategies described in this report. Training modules for personnel that will be responsible for implementing the FLEX strategies, and Emergency Response Organization personnel, will be developed to ensure personnel proficiency in the mitigation strategies for BDBEEs. The training will be implemented and maintained per existing Seabrook Station training programs. The details, objectives, frequency, and success measures will follow the Station's 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, utilizing available procedures, job aids, instructions, and mitigating strategy time constraints.

	Training will be completed prior to final implementation of the requirements of this Order in the Fall of 2015.
Describe Regional Response Center plan	The Pooled Inventory Management group (PIM) and AREVA were awarded the Industry contract to establish the Strategic Alliance for FLEX Emergency Response (SAFER). SAFER will be establishing Regional Response Centers (RRCs) for the acquisition, maintenance, and deployment of portable FLEX equipment for response to BDBEEs. NextEra Energy Seabrook LLC became a member of PIM/SAFER in December, 2012. The SAFER organization has committed to an RRC operational date of 7/11/2015 for those licensees with Order effective dates in the Fall of 2015. As currently planned, each RRC will hold five (5) sets of equipment, four (4) of which will be fully deployable when requested. The fifth set is assumed to have equipment in a maintenance cycle. As part of Phase 3 event response, equipment will be moved from an RRC to a local Assembly Area established by the SAFER team and the utility. Communications will be established between Seabrook Station and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's 'playbook', will be delivered to the site's staging area within 24 hours from the initial request.
Notes:	

	Training will be completed prior to final implementation of the requirements of this Order in the Fall of 2015.
Describe Regional Response Center plan	The Pooled Inventory Management group (PIM) and AREVA were awarded the Industry contract to establish the Strategic Alliance for FLEX Emergency Response (SAFER). SAFER will be establishing Regional Response Centers (RRCs) for the acquisition, maintenance, and deployment of portable FLEX equipment for response to BDBEEs. NextEra Energy Seabrook LLC became a member of PIM/SAFER in December, 2012. The SAFER organization has committed to an RRC operational date of 7/11/2015 for those licensees with Order effective dates in the Fall of 2015. As currently planned, each RRC will hold five (5) sets of equipment, four (4) of which will be fully deployable when requested. The fifth set is assumed to have equipment in a maintenance cycle. As part of Phase 3 event response, equipment will be moved from an RRC to a local Assembly Area established by the SAFER team and the utility. Communications will be established between Seabrook Station and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's 'playbook', will be delivered to the site's staging area within 24 hours from the initial request.
Notes:	

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 Steam Generators for makeup with portable injection source**
- **Sustained Source of Water**

PWR Installed Equipment Phase 1

The plant trips due to a loss of offsite power caused by the BDBEE. For a BDBEE with significant warning such as a hurricane or severe winter storm it's also possible that the plant will already be shutdown in Mode 3 or Mode 4 in accordance with OS1200.03, 'Severe Weather Conditions' [Ref. 10], at the time the loss of offsite power occurs.

In accordance with the event assumptions contained in NEI 12-06, neither Emergency Diesel Generator is available to respond to the event. Consequently, the operating crew will enter Emergency Operating Procedure ECA-0.0, 'Loss of All AC Power' [Refs. 11 & 12].

The operating crew will attempt to manually start the EDGs which is assumed to be unsuccessful. The SEPS generators are assumed to start automatically as designed and run in standby until manually connected to an Emergency Bus. If necessary, SEPS can also be started manually from the digital control panel in the 'B' Essential Switchgear Room or locally from the digital control panels in each genset enclosure in accordance with OS1061.01, 'Operation of SEPS' [Ref 13].

As directed by ECA-0.0, the operating crew will manually close the SEPS breaker to 4.16 kV bus E6 ('B' Train vital power) from the Control Room, or locally in the 'B' Train Essential Switchgear Room. This action re-powers Bus E6 to supply 'B' Train ELAP loads. If Bus E6 is unavailable SEPS can be manually aligned and connected to Bus E5 ('A' Train vital power) [see Note 1]. Figure 2 in Attachment 3 provides a one-line diagram of SEPS connections to the 4.16 KV Emergency Busses.

Once a 4.16 KV Emergency Bus is energized, ECA-0.0 directs the operators to verify that a centrifugal charging pump (CCP), a thermal barrier cooling water (TBCW) pump, a primary component cooling water (PCCW) pump, the motor-driven EFW pump, and an ocean Service Water (SW) pump or a Cooling Tower (CT) pump are started by the Emergency Power Sequencer (EPS). Operation of a CCP and a TBCW pump ensures adequate RCP seal cooling throughout the event.

The operating crew will confirm that an Extended Loss of Offsite Power event is in progress either through visual observation of physical damage to the station switchyard or

[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.

via information obtained from the electrical grid load dispatcher.

The operating crew will implement Attachment 'A' of ECA-0.0 to ensure emergency bus loading is within the capacity of one SEPS genset (2640 KW net). This ensures that if one genset automatically shuts down for some reason, the remaining unit will not be overloaded. Extended Loss of Offsite Power loads currently listed in Attachment 'A' include the following:

- Service Water Cooling Tower Pump - 609 KW
- Primary Component Cooling water pump - 576 KW ('B' Train), 549 KW ('A' Train)
- The motor-driven EFW pump (as backup to the steam-driven pump during Phase 2 coping) - 669 KW
- Centrifugal Charging Pump - 554 KW
- Residual Heat Removal pump - 343 KW

Extended Loss of Offsite Power loads not currently listed in ECA-0.0, Attachment 'A' include:

- Spent Fuel Pool Cooling pump - 17 KW
- Thermal Barrier Cooling Water pump - 18 KW
- Vital 480 VAC Unit Substations that provide power to the vital battery chargers, vital instrumentation inverters, and control room lighting and ventilation - approximately 300 KW.

Once a 4.16 kV Emergency Bus is re-powered from SEPS, the crew will exit ECA-0.0 to ES-0.1, 'Reactor Trip Response' [Refs. 14 & 15]. This also marks the transition point from Phase 1 to Phase 2 event coping.

Reactor Coolant System (RCS) heat sink will be maintained in the Phase 1 coping period by feeding the Steam Generators (SGs) using the turbine-driven EFW pump while steaming to the atmosphere via the Atmospheric Steam Dump Valves (ASDVs) on each main steamline.

Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs are anticipated. Seabrook will review the PWR Owners Group (PWROG) recommended procedure changes as well as the draft FLEX Support Guidelines (FSGs) and determine what procedural changes are necessary. Potential EOP changes discussed in this section of the report include (see list of Pending Actions (PA) in Attachment #7): • Revise ECA-0.0 to include a step to determine if an extended loss of offsite power event is in progress. This determination will delineate future procedural strategies and transitions [PA

	#1]. • Revise ECA-0.0, Attachment 'A' to include a Table of loads for an extended loss of offsite power event or create a new Attachment with this information [PA #2].
Identify modifications	No plant modifications are required to support Phase 1 coping. An evaluation will be conducted on the non-seismic connections to the upper half of the CST to determine if Seabrook can take credit for the entire tank volume for Phase 1 & 2 event coping [PA #3]. An existing analysis for SEPS loading will be reviewed and revised as necessary to support the ELAP response strategies [see PA # 15].
Key Reactor Parameters	The response strategies described in this report ensure that at least one train of safety-related vital instrumentation is available to the control room operators at all times. This instrumentation includes the following: • Core Exit Thermocouples • Pressurizer Level • Reactor Vessel Level Indication System (RVLIS) • Steam Generator Pressure • Reactor Coolant System Wide Range Hot Leg Temperature • Reactor Coolant System Wide Range Cold Leg Temperature • Reactor Coolant System Wide Range Pressure • Steam Generator Narrow Range and Wide Range Level • Condensate Storage Tank Level • Containment Wide Range Pressure • Spent Fuel Pool Level (including new wide range level per NRC Order EA-12-051) • Emergency Feedwater Flow
Notes: 1. Bus E5 provides power to the Main Plant Computer System (plant process computer) as well as several plant communications systems (e.g., radio repeaters). In the event of an extended loss of power to Bus E5, Seabrook will implement the Emergency Communications Plan described in the Station's response to Recommendation 9.3 (Communications) of the March 12,2012 Request For Information (10CFR 50.54 (f) letter).	

Maintain Core Cooling & Heat Removal
PWR Portable Equipment Phase 2
As noted in the previous section of this report, Seabrook's Phase 2 coping response begins when an Emergency 4.16 KV Bus is re-powered from SEPS (Bus E6 preferred). RCS heat sink will be maintained by feeding the SGs using the turbine-driven EFW pump while steaming to the atmosphere via the ASDVs on each main steamline. The turbine-driven EFW (TDEFW) pump is assumed to automatically start as designed and provide EFW flow to all four SGs. The TDEFW pump is assumed to be up to speed and providing flow to the SGs within 2 minutes of receiving an EFW actuation signal. This time is based on the Acceptance Criteria of surveillance test procedure OX1436.13, 'Turbine Driven EFW Pump Post Cold Shutdown or Post Maintenance Surveillance and Comprehensive Pump Test' [Ref. 16], which requires pump discharge pressure to be greater than or equal to 1460 psig in less than or equal to 73 seconds after receipt of an EFW actuation signal. If the TDEFW pump does not start automatically, ECA-0.0 provides direction to locally start the pump in accordance with normal operating procedure OS1036.03, 'Resetting the Steam Driven EFW Pump Trip Valve' [Ref. 17]. A preliminary Engineering calculation indicates that TDEFW pump operation can be maintained for greater than one week based upon the decay heat load present at 100 Effective Full Power days of operation (NEI 12-06 assumption). The motor-driven EFW pump is powered from bus E6 and will be started by the Emergency Power Sequencer (EPS) when Bus E6 is re-powered from SEPS. This pump will be shutdown manually by the operating crew and placed in standby. This action keeps the motor-driven EFW pump available as a backup to the TDEFW pump while concurrently reducing the electrical load on SEPS. The action to shutdown the motor-driven EFW pump in an extended loss of offsite power event is not currently contained in the EOPs. After the motor-driven EFW pump is shutdown, SEPS loading on Bus E6 will be approximately 2075 KW, which is less than the single generator rated load of 2640KW (net). This provides adequate margin for starting an RHR pump (343 KW), two Control Rod Drive Mechanism (CRDM) cooling fans (24 KW each), a Cooling Tower Fan (if necessary - 155KW), and other minor loads later in the coping response. Powering this additional equipment from SEPS brings the load value up to 2621KW which is still below the net rated load for a single genset. In accordance with current station design, only the water volume contained in the lower half of the seismic Cat-1 Condensate Storage Tank (CST) is assumed to be available (approximately 212,000 gallons) due to the non-seismically rated connections that penetrate the upper half of the tank. This water volume is sufficient to support EFW flow to the SGs to maintain an RCS heat sink (i.e., maintain the plant in Mode 3), as well as supporting a cooldown and depressurization of the RCS to Residual Heat Removal System (RHR) operating conditions within 8 to 9 hours of event initiation [Ref. 18].

Emergency Operating Procedures ECA-0.0 and ES-0.1 direct the operating crew to begin makeup to the CST early in the procedure to preclude low inventory conditions. However, the strategy described in this report is not CST inventory limited. As noted previously, a plant cooldown to RHR system operating conditions can be accomplished within 8-9 hours of the plant trip which is within the inventory available in the bottom half of the tank even if CST makeup is not initiated. However, to achieve additional margin, a seismic evaluation of the connections to the upper half of the CST will be conducted to determine what, if any, modifications are required to allow taking credit for the entire tank water volume. This would increase the available water volume in the CST by approximately 200,000 gallons and extend SG heat sink coping time to approximately 24 hours.

With SEPS powering Bus E6, control and instrument power will be available to support remote operation of 'B' Train vital components from the Control Room. The strategies described in this report do not start the Service Air compressor powered from Bus E6 due to SEPS loading limitations. The Service Air system provides air pressure to the Instrument Air system which provides control air pressure to pneumatic components.

The Station Service Air compressors are located on the ground elevation of the Turbine Building which is a robust structure but is not rated seismic Cat-1. Therefore, the Service Air compressors are assumed to be unavailable for event response. However, a trailer-mounted diesel-driven air compressor is stored on the Turbine Building ground elevation. This compressor serves as a backup source of air for the Service Air / Instrument Air system and may be connected and placed in service in accordance with ON1042.01, 'Operation of the Compressed Air System' [Ref. 19].

Each ASDV has a nitrogen backup supply to support remote operation in the event of a loss of instrument air pressure. The nitrogen backup supply provides the capability to fully stroke each ASDV open and closed at least 10 times within a ten hour period following loss of control air pressure.

The ASDV control methodology directed by ECA-0.0 is to use each of the ASDV 'jog' control switches to directly control valve position. This methodology has the operator use the Open and Close positions on the jog switches to change valve position and then place the switch in 'Position Maintained'. This action 'locks up' the valve positioner preventing any bleed off of control air pressure. The ASDVs can be operated remotely for an extended period of time using this method to minimize loss of nitrogen gas pressure. If necessary, the ASDVs can also be operated locally by a field operator in accordance with OS1090.01, 'Manual Operation of Remotely Operated Valves' [Ref. 20].

The operating crew will stabilize plant conditions in ES-0.1 and then transition to ES-02, 'Natural Circulation Cooldown' [Refs. 21 & 22]. This transition is required because restoration of offsite power and re-starting of a Reactor Coolant Pump are not assumed for this event.

Prior to commencing a RCS cooldown, a rapid boration is required to achieve Cold Shutdown boron concentration. This requires opening the rapid boration valve (CS-V426) which provides 7000 ppm boric acid to the charging pump suction. CS-V426 is powered from a "B" Train motor control center (MCC), therefore it can be operated from the control room with SEPS powering Bus E6. If necessary, this valve can also be opened locally by a

field operator in the Boric Acid Storage Tank room. An alternate available borated water source is the Refueling Water Storage Tank (RWST) which can be aligned to the charging pump suction.

ES-0.2 directs a cooldown to Cold Shutdown (Mode 5). This ensures that the 'B' Train Residual Heat Removal (RHR) system can be placed in operation prior to expending available water volume in the CST.

The Primary Component Cooling Water (PCCW) system provides cooling water to safety-related equipment, including the RHR pump and RHR heat exchanger [Ref. 23]. The PCCW system also provides cooling water flow to the spent fuel pool heat exchanger in the Fuel Storage Building and the RCP Thermal Barrier cooling loop located inside the Containment Building.

The PCCW heat exchanger is provided with cooling water flow from the Service Water system . As previously discussed, the 'B' Train Cooling Tower pump is providing Service Water system flow with the Cooling Tower established as the backup Ultimate Heat Sink. PCCW system temperature is controlled by air-operated temperature control and bypass valves which are provided with a nitrogen backup supply in the event that control air pressure is lost. The safety-related nitrogen backup supply is sized to provide 10 full cycles of the temperature control and bypass valves over a 6 hour period. If necessary, these valves can also be operated locally in the Primary Auxiliary Building by a field operator.

The operating crew will use the guidance provided in ES-0.2 to perform a cooldown and de-pressurization of the RCS to a point where the RHR system can be placed in service (RCS temperature less than 350°F and RCS pressure less than 360 psig).

While unlikely because of Seabrook's Tcold reactor vessel head design, if a steam void is drawn in the vessel head during the cooldown and it cannot be collapsed, the operating crew will transition to ES-0.3, 'Natural Circulation Cooldown With Steam Void in Vessel (With RVLIS)' [Ref 24 & 25], if RVLIS is available, or ES-0.4, 'Natural Circulation Cooldown With Steam Void in Vessel (Without RVLIS)' [Ref. 26 & 27], if RVLIS is unavailable.

The NEI 12-06 assumption of the loss of normal access to the Ultimate Heat Sink (UHS) means that the ocean Service Water pumps are assumed to be unavailable for the duration of the event. Consequently, Seabrook will rely on the Service Water Cooling Tower as a backup ultimate heat sink. Heat sink will be restored by starting the 'B' Cooling Tower pump to restore flow in the 'B' Train Service Water System. This action can also be accomplished by manual actuation of a Tower Actuation Signal from the control room.

Once RCS temperature and pressure have been reduced to RHR system operating conditions the RHR system will be placed in service in accordance with Normal Operating Procedure OS1013.04, 'RHR Train 'B' Startup and Operation' [Ref. 28], to continue the RCS cooldown to Mode 5. The RHR system will be used to maintain the RCS in Mode 5 for long-term coping.

As discussed previously, at some point during the Phase 2 coping period the operators may connect the portable diesel-driven air compressor stored in the Turbine Building to the Service Air system to restore Instrument Air system pressure. However, this action is not

necessary for successful Phase 2 coping. It is anticipated that the operating crew will evaluate refueling strategies for the SEPS gensets relatively early in the event. This action should not be delayed past 36 hours to allow adequate time for strategy implementation. NEI 12-06 Section 3.2.2.(13) requires that "Regardless of installed coping capability, all plants will include the ability to use portable pumps to provide RPV/RCS/SG makeup as a means to provide a diverse capability beyond installed equipment." At Seabrook Station this ability is defined in Severe Accident Management Guidelines SAG-1, 'Inject into SGs' [Ref. 33], and SAG-3, 'Inject into the RCS' [Ref. 34]. SAG-1 implements a strategy to feed the SGs from the Portable Diesel Driven Pump (PDDP is Seabrook's designation for the B.5.b pump) via drain line connections on the main feedwater lines outside Containment. SAG-3 implements a strategy to inject into the RCS using the PDDP connected to the suction lines of the charging pumps, SI pumps, or RHR pumps. Existing rules of EOP usage do not invoke the Severe Accident Management Guidelines (SAMGs) until core damage is imminent or has already occurred. Consequently, new FLEX Support Guidelines may need to be developed for this purpose or transition points to these two SAMGs could be added to the applicable EOPs. Seabrook will review the guidance provided by the PWROG and determine which course of action is appropriate (see PA #22 in Attachment #7).

Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs are anticipated. Seabrook will review the PWROG recommended procedure changes as well as the draft FLEX Support Guidelines (FSGs) and determine what procedural changes are necessary. Potential EOP changes and Flex Support Guideline (FSG) development discussed in this section of the report include (see list of Pending Actions (PA) in Attachment #7): • Revise ECA-0.0 or ES-0.1 to add a step to manually shutdown the motor-driven EFW pump if the TDEFW pump is running satisfactorily. This reduces the loading on SEPS and maintains the pump in standby in the event a problem develops with the TDEFW pump [PA #4]. • Add an Attachment to ES-0.2, ES-0.3, and ES-0.4 that provides a Table of electrical loads for responding to an extended loss of offsite power event [PA #5]. • Develop a SEPS genset refueling strategy from 1) an offsite supplier outside a 25 mile radius from the station (primary strategy), and 2) the EDG fuel oil storage tanks using a refueling trailer stored in the SW Pumphouse (backup

	strategy) [PA #6]. • Revise ES-0.2, ES-0.3, and ES-0.4 to include a step for implementation of a SEPS genset refueling strategy. [PA #7]. • Develop a FSG for refueling SEPS from the EDG fuel oil storage tanks using a portable refueling trailer. Utilize the information contained in existing procedure OS1061.02, 'Receipt of SEPS Fuel Oil', for development of the FSG [PA #8]. • Revise ES-0.2, ES-0.3, and ES-0.4 to include direction for connecting the backup diesel-driven air compressor to the Service Air system to restore Instrument Air system pressure [PA #9]. • Develop required Preventive Maintenance actions and Surveillance test procedures for the refueling trailer to be procured and stored in the Service Water Pumphouse [PA #10]. • Revise OS1246.01, 'Loss of Offsite Power - Plant Shutdown', to address a reactor de-fueled condition ('Mode 7'). In that case restoration of spent fuel pool cooling is paramount as opposed to restoration of RHR cooling [PA #11].
Identify modifications	In order to credit SEPS as pre-positioned FLEX equipment the following evaluations and potential modifications are anticipated (see list of Pending Actions in Attachment #7): • Conduct an Engineering Evaluation to determine if the existing hurricane enclosures for the SEPS gensets provide adequate missile protection. If protection is not adequate, develop a design change (EC) to add missile protection for the SEPS gensets [PA #12]. • Evaluate the 'seismic robustness' of SEPS and determine if enhancements are needed with respect to the new Ground Motion Response Spectrum (GMRS) data for the site. This data will not be available until the seismic hazard re-evaluation is conducted in accordance Recommendation 2.1 of the RFI letter [PA #13]. • Once the site flooding re-evaluation is completed in accordance with Recommendation 2.1 of the RFI letter, determine if additional flood protection is necessary for SEPS [PA #14]. • Formalize the Engineering assessment of ELAP load capacity for a single SEPS genset and modify procedural guidance in the applicable EOPs and AOPs, as necessary

	[PA #15].
Key Reactor Parameters	As discussed previously, one train of safety-related vital instrumentation will be powered from SEPS. This will provide the operators with the necessary instrumentation to monitor critical plant parameters. This instrumentation includes the following: • Core Exit Thermocouples • Pressurizer Level • Reactor Vessel Level Indication System (RVLIS) • Steam Generator Pressure • Reactor Coolant System Wide Range Hot Leg Temperature • Reactor Coolant System Wide Range Cold Leg Temperature • Reactor Coolant System Wide Range Pressure • Steam Generator Narrow Range and Wide Range Level • Condensate Storage Tank Level • Containment Wide Range Pressure • Spent Fuel Pool Level (including new wide range level per NRC Order EA-12-051) • Emergency Feedwater Flow
Storage / Protection of Equipment	
Seismic	Stephenson & Associates report 11C4961-RPT-001, 'Review of Seismic Issues Related to GI-199", dated July, 2011 [Ref 29], includes several recommendations regarding improvements to the seismic 'robustness' of the SEPS gensets. The information in this report will be reviewed as part of the seismic design basis re-evaluation which is required by Recommendation 2.1 of the March 12, 2012 Request For Information (10CFR 50.54 (f)) letter. If necessary, modifications will be made to strengthen SEPS with respect to seismic events [see PA #13].
Flooding	The SEPS gensets and associated controls and auxiliary equipment are installed above the current design basis flood plain. The site design basis flood will be re-evaluated as part of the station's flooding design basis re-evaluation which is required by Recommendation 2.1 of the March 12, 2012 Request For Information (10CFR 50.54 (f)) letter. If the design basis flood plain increases, the flooding protection for SEPS will be re-evaluated and

	modifications will be implemented as necessary [see PA #14].
Severe Storms with High Winds	The SEPS gensets have hurricane weather protection enclosures. An evaluation of the current wind-driven missile protection for SEPS will be conducted to determine if the existing enclosures are adequate or if additional missile protection is required [see PA #9]. See Figure 7 in Attachment 3 for a conceptual diagram of the location of potential missile shield barriers for the SEPS gensets.
Snow, Ice, and Extreme Cold	The SEPS gensets are protected from the elements by weather-proof enclosures and the engine cooling system contains the required amount of glycol anti-freeze to protect the engines to minus 32°F. The SEPS gensets are also included in the site snow removal plan to ensure the engine air intake system is clear of snow and ice. The impact of missile protection barriers that may be installed to protect the SEPS gensets on the capability to implement the snow removal plan will be evaluated and revisions to the plan will be made as necessary [PA #16].
High Temperatures	Seabrook Station 'screens out' of the high temperature hazard described in Section 9 of NEI 12-06.

Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	With the exception of the backup strategy for refueling the SEPS gensets the strategies described in this report do not rely on the deployment of portable equipment for Phase 2 coping. No plant modifications are required to implement this alternate refueling strategy.	Connections to the SEPS gensets are protected from a BDBEE as they are located within the seismic Cat-1, flood and missile protected Control Building. Connections to the EDG fuel oil storage tank drain lines for transfer of fuel to a portable refueling trailer are protected by the Seismic Cat-1, flood and missile protected Diesel Generator Building.

Maintain Core Cooling & Heat Removal

PWR Portable Equipment Phase 3

Phase 3 coping begins when portable equipment received from the Regional Response Center (RRC) is placed in service.

Seabrook's request to the RRC for equipment needed after the 24 hour point in the event will include:

1. Two - 2 MW, 4.16 KV, air cooled, trailer-mounted generators to power the station Emergency Bus not being powered from SEPS.

   These generators provide defense-in-depth for event response if one or both of the SEPS gensets have operational problems at any time during the indefinite coping period. Re-powering Bus E5 also provides additional capability and flexibility for station response by restoring the main plant process computer system and communications equipment such as the site radio repeaters.

2. Two sets of 250 foot 3-phase power cabling for connecting the trailer-mounted generators to a station Emergency bus.

It is assumed that the two - 2 MW diesel generators will arrive at the site staging area (General Office Building parking lot) from the RRC between 24 and 72 hours into the event. The generators will be deployed from the staging area through the Protected Area vehicle trap under the control of Station Security. Alternatively, the equipment may be deployed through the Security fence gate located near the Cooling Tower (see Figure 8 in Attachment 3).

These generators will be connected to whichever 4.16 KV Emergency Bus is not being powered by SEPS (typically Bus E5). The proposed methodology for connecting the RRC generators to Bus E5 is as follows:

- Deploy generators outside of the Non-essential Switchgear Room.
- Route power cabling (~250 ft) from the generators through the exterior door of the Non-essential Switchgear Room, and through door C100 into the Train 'A' Essential Switchgear Room.
- De-terminate installed Bus connector cables on the load side of breaker <A5A> (Bus 5 SEPS Switchgear).
- Terminate power cabling connectors from the RRC generators on the load side of breaker <A5A>.
- Start RRC generators and sequentially close breakers of required 4.16 KV and 480 VAC loads while monitoring generator loading.

If necessary, debris removal from the Phase 3 portable equipment deployment route will be accomplished using existing site equipment (see Attachment 5). This debris removal equipment is stored at various site locations which ensures that an adequate cross-section

Maintain Core Cooling & Heat Removal	
PWR Portable Equipment Phase 3	
of equipment will survive the BDBEE. Additionally, the Station has a snow melting machine that is stored inside the Protected Area during the Winter months that can be used in the event that the BDBEE is caused by a severe Winter storm. Two 500 gallon diesel fuel oil tanks are also pre-staged in the Protected Area during the Winter to provide fuel for the snow melter and snow removal equipment. A large tanker truck of diesel fuel (approx. 20,000 gallons) will be used to fuel the RRC generators as well as SEPS. This fuel will be provided from a contracted fuel supplier at least 25 miles from Seabrook Station [see PA #17]. As an alternate / backup strategy for diesel generator refueling, Seabrook will evaluate procurement of a refueling trailer that can be used to transfer fuel from the EDG fuel oil storage tanks (see Figures 6 & 9 in Attachment 3). This refueling trailer will be stored, unfueled, in the seismic Cat-1 Service Water pumphouse. Portable pumps, hosing, and connectors to support the transfer of fuel will be stored with the refueling trailer. [see PA #8]. Additional possible sources of on-site diesel fuel which may be available following a BDBEE include: • The 6000 gallon diesel fuel tank at the vehicle maintenance shop. This tank is not seismically rated but is situated above the site design basis flood plain. This tank is partially missile protected by a cement retaining wall and a dirt embankment. The fueling station pump is provided with backup power in the event of a site blackout by a dedicated 'B.5.b' portable generator. Station Site Services has a 500 gallon portable fuel trailer that is normally stored in the vicinity of the Vehicle Maintenance Shop that can be used to transfer fuel from this diesel fuel oil tank to portable equipment in the Protected Area. • Two 30,000 gallon Auxiliary Boiler fuel oil storage tanks. These tanks are not seismically rated but are situated above the site design flood plain. The tanks are partially missile protected by the Unit 2 Turbine Building to the East and the unfinished Unit 2 PAB and EDG buildings to the South. These tanks contain No. 2 heating oil which is specified in station procedures as a backup source of fuel for portable diesel engines.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs are anticipated. Seabrook will review the PWROG recommended procedure changes as well as the draft FLEX Support Guidelines (FSGs) and determine what procedural changes are necessary. Potential EOP changes and FSG development discussed in this section of the report include:

Maintain Core Cooling & Heat Removal	
PWR Portable Equipment Phase 3	
	• Develop a FSG for staging and deployment of Phase 3 equipment from the RRCs into the Protected Area [PA #18]. • Develop a FSG for connecting the 2MW generators from the RRC to 4.16 KV Emergency Busses E5 and E6 [PA #19]. • Develop a FSG for refueling the RRC generators [PA #20].
Identify modifications	No plant modifications are currently anticipated in order to connect one or more 2 MW generators from the RRC using approved standard connectors (i.e. standard bus bar bolted connections).
Key Reactor Parameters	As discussed previously, one train of safety-related vital instrumentation will be powered from SEPS. For Phase 3 coping, a second train of vital instrumentation can be powered from the 4.16 KV generators provided by the RRC. This instrumentation includes the following: • Core Exit Thermocouples • Pressurizer Level • Reactor Vessel Level Indication System (RVLIS) • Steam Generator Pressure • Reactor Coolant System Wide Range Hot Leg Temperature • Reactor Coolant System Wide Range Cold Leg Temperature • Reactor Coolant System Wide Range Pressure • Steam Generator Narrow Range and Wide Range Level • Condensate Storage Tank Level • Containment Wide Range Pressure • Spent Fuel Pool Level (including new wide range level per NRC Order EA-12-051) • Emergency Feedwater Flow

Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy	No plant modifications are	The Connection points to Bus E5

Maintain Core Cooling & Heat Removal		
PWR Portable Equipment Phase 3		
including how the equipment will be deployed to the point of use.	required to connect a portable generator to 4.16KV switchgear with standard bolted bus bar connections.	or E6 are physically located inside the Essential Switchgear rooms which are part of the seismic Cat-1 Control Building.

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	
A detailed description of the Phase 1 coping event sequence and associated strategies was provided in the "Maintain Core Cooling & Heat Removal" section of this report. No additional Phase 1 coping strategies are required to support the RCS Inventory Control safety function. Seabrook intends to install low leakage Reactor Coolant Pump seals on all four RCPs as a backup mitigation strategy against significant RCS leakage to Containment during an ELAP event. RCP 'shutdown seals' are designed to provide essentially zero leakage for at least 72 hours. However, in terms of the event sequence described in this report, these seals are not expected to actuate as seal injection flow from a CCP and/or TBCW flow is re-established early in the Phase 2 coping period. As noted previously, SEPS will be used to provide power to a 4.16KV Emergency Bus. Consequently, a CCP can be utilized to maintain RCS inventory within the range specified in the EOP network and also to borate the RCS to the required shutdown boron concentration prior to or during a cooldown to Cold Shutdown. Borated water will be provided from the Boric Acid Storage Tanks or alternately from the RWST.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs are anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX Guidelines and determine what procedural changes are necessary. Potential EOP changes and FSG development were discussed in the "Maintain Core Cooling & Heat Removal" section of this report. No additional changes are expected for the RCS Inventory Control safety function.
Identify modifications	Implement low leakage RCP seals on all four RCPs (vendor and design to be determined) [PA #21].

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

Maintain RCS Inventory Control	
Key Reactor Parameters	As previously discussed in this report, one train of safety-related vital instrumentation will be powered from SEPS. This will provide the operators with the necessary instrumentation to monitor critical plant parameters. This instrumentation includes the following: • Core Exit Thermocouples • Pressurizer Level • Reactor Vessel Level Indication System (RVLIS) • Steam Generator Pressure • Reactor Coolant System Wide Range Hot Leg Temperature • Reactor Coolant System Wide Range Cold Leg Temperature • Reactor Coolant System Wide Range Pressure • Steam Generator Narrow Range and Wide Range Level • Condensate Storage Tank Level • Containment Wide Range Pressure • Spent Fuel Pool Level (including new wide range level per NRC Order EA-12-051) • Emergency Feedwater Flow

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2	
A detailed description of the Phase 2 coping event sequence and associated strategies was provided in the "Maintain Core Cooling & Heat Removal" section of this report. No additional Phase 2 coping strategies are required to support maintenance of the RCS Inventory Control safety function. As previously described, the SEPS gensets are considered to be pre-staged FLEX equipment in this strategy. Consequently, Phase 2 coping for Seabrook begins when a 4.16 KV Emergency Bus is re-powered from SEPS.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs is anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX guidelines and determine what procedural changes are necessary. Potential EOP changes and FSG development were discussed in the "Maintain Core Cooling & Heat Removal" section of this report. No additional changes are expected for the RCS Inventory Control safety function.
Identify modifications	As noted previously, Seabrook Station intends to install low leakage seals on all four Reactor Coolant Pumps.
Key Reactor Parameters	As noted previously, one train of safety-related vital instrumentation will be powered from SEPS. This will provide the operators with the necessary instrumentation to monitor critical plant parameters. This instrumentation includes the following: • Core Exit Thermocouples • Pressurizer Level • Reactor Vessel Level Indication System (RVLIS) • Steam Generator Pressure • Reactor Coolant System Wide Range Hot Leg Temperature • Reactor Coolant System Wide Range Cold Leg Temperature • Reactor Coolant System Wide Range Pressure • Steam Generator Narrow Range and Wide Range Level • Condensate Storage Tank Level

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2	
	• Containment Wide Range Pressure • Spent Fuel Pool Level (including new wide range level per NRC Order EA-12-051) • Emergency Feedwater Flow
Storage / Protection of Equipment	
Seismic	Seismic protection of FLEX equipment was addressed previously in this report.
Flooding	Flooding protection of FLEX equipment was addressed previously in this report.
Severe Storms with High Winds	Strategies to protect FLEX equipment from wind-driven missiles was addressed previously in this report.
Snow, Ice, and Extreme Cold	Snow, Ice, and extreme cold protection of FLEX equipment was addressed previously in this report.
High Temperatures	As noted previously, Seabrook Station 'screens out' from the high temperature hazard described in Section 9 of NEI 12-06.

Deployment Conceptual Modification		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	As noted previously, Seabrook Station intends to install low leakage seals on all four Reactor Coolant Pumps (see Attachment 2).	No connections to portable equipment other than those described in the 'Maintain Core Cooling & Heat Removal' section of this report are required to support the RCS Inventory Control safety function.

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 3	
A detailed description of the Phase 3 coping event sequence and associated strategies was provided in the "Maintain Core Cooling & Heat Removal" section of this report. No additional Phase 3 coping strategies are required to support the RCS Inventory Control safety function.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs is anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX guidelines and determine what procedural changes are necessary. Potential EOP changes and FSG development were discussed in the "Maintain Core Cooling & Heat Removal" section of this report. No additional changes are expected for the RCS Inventory Control safety function.
Identify modifications	No Phase 3 plant modifications have been identified to support the RCS Inventory Control safety function.
Key Reactor Parameters	As noted previously, one train of safety-related vital instrumentation will be powered from SEPS. For Phase 3 coping a second train of vital instrumentation will be available when the second Emergency Bus is re-powered by the RRC generator(s). This instrumentation includes the following: • Core Exit Thermocouples • Pressurizer Level • Reactor Vessel Level Indication System (RVLIS) • Steam Generator Pressure • Reactor Coolant System Wide Range Hot Leg Temperature • Reactor Coolant System Wide Range Cold Leg Temperature • Reactor Coolant System Wide Range Pressure • Steam Generator Narrow Range and Wide Range Level • Condensate Storage Tank Level • Containment Wide Range Pressure

Maintain RCS Inventory Control		
PWR Portable Equipment Phase 3		
	• Spent Fuel Pool Level (including new wide range level per NRC Order EA-12-051) • Emergency Feedwater Flow	
Deployment Conceptual Modification		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	No plant modifications are necessary to support Phase 3 coping for the RCS Inventory Control safety function.	No connections to portable equipment other than those described in the 'Maintain Core Cooling & Heat Removal' section of this report are required to support the RCS Inventory Control safety function.

Maintain Containment
Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • Containment Spray • Hydrogen igniters (ice condenser containments only)
PWR Installed Equipment Phase 1
A detailed description of the Phase 1 coping event sequence and associated strategies was provided in the "Maintain Core Cooling & Heat Removal" section of this report. With power being provided to a 4.16 KV Emergency Bus from SEPS early in the event, seal injection flow to the RCP seals is maintained and the thermal barrier cooling system is available as a backup cooling source if seal injection is lost. Consequently, there is no significant mass loss to the Containment Building during the event and no challenge to the Containment safety function (Seabrook Containment design pressure is 52 psig). If RCP seal injection flow or thermal barrier cooling water flow is lost or cannot be established for some reason, the RCP low leakage seals will actuate to prevent significant leakage from the pump seals into Containment. With RCP shutdown seals actuated there will be minimal RCS mass loss to Containment. Consequently, there are no Phase 1 actions required for Containment pressure mitigation.
Details

Provide a brief description of Procedures / Strategies / Guidelines	No procedural strategies other than those already contained in the EOP network are required to maintain the Containment safety function.
Identify modifications	No plant modifications are required to maintain the Containment safety function.
Key Containment Parameters	As noted previously, one train of safety-related vital instrumentation will be powered from SEPS. This instrumentation includes Containment parameters.

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

Maintain Containment	
PWR Portable Equipment Phase 2	
A detailed description of the Phase 2 coping event sequence and associated strategies was provided in the "Maintain Core Cooling & Heat Removal" section of this report. Phase 2 coping for Seabrook begins when a 4.16 KV Emergency Bus is re-powered from SEPS. Containment design pressure of 52 psig will not be challenged at any time during the ELAP event, therefore, no Phase 2 coping strategy is required for Seabrook.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Revisions to a number of EOPs and AOPs is anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX guidelines and determine what procedural changes are necessary. Potential EOP changes and FSG development were discussed in the "Maintain Core Cooling & Heat Removal" section of this report. No new strategies for the Containment safety function are required for Seabrook as the existing EOP network provides actions for monitoring Containment parameters.
Identify modifications	No plant modifications are necessary for Phase 2 coping strategy implementation for the Containment safety function.
Key Containment Parameters	As noted previously one train of safety-related vital instrumentation will be powered from SEPS. This instrumentation includes Containment parameters.
Storage / Protection of Equipment	
Seismic	Seismic protection of FLEX equipment was addressed previously in this report.
Flooding	Flooding protection of FLEX equipment was addressed previously in this report.
Severe Storms with High Winds	Strategies to protect FLEX equipment from wind-driven missiles was addressed previously in this report.
Snow, Ice, and Extreme Cold	Snow, Ice, and extreme cold protection of FLEX equipment was addressed previously in this report.
High Temperatures	As noted previously, Seabrook Station 'screens out' from the high

Maintain Containment		
	temperature hazard described in Section 9 of NEI 12-06.	
Deployment Conceptual Modification		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	As noted previously, no plant modifications are necessary to maintain the Containment safety function.	No connections to portable equipment are required to maintain the Containment safety function.

Maintain Containment	
PWR Portable Equipment Phase 3	
A detailed description of the Phase 3 coping event sequence and associated strategies was provided in the "Maintain Core Cooling & Heat Removal" section of this report. No additional Phase 3 coping strategies are required to support the Containment safety function. When Phase 3 coping is implemented the plant should already be in Cold Shutdown (Mode 5) with core cooling being maintained by the Residual Heat Removal System. This strategy eliminates a Containment pressure challenge during the indefinite coping period. Once the second 4.16 KV Emergency Bus is powered from the RRC generator(s) the Technical Support Center may direct the operating crew to start one or more Containment fan coolers as necessary to control Containment temperature for the duration of the coping period.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	As noted previously, no Phase 3 strategy is required to maintain the Containment safety function.
Identify modifications	No plant modifications are required to maintain the Containment safety function.
Key Containment Parameters	As noted previously one train of safety-related vital instrumentation will be powered from SEPS. This instrumentation includes Containment parameters.

Deployment Conceptual Modification		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	As noted previously, no plant modifications are necessary to maintain the Containment safety function.	No connections to portable equipment are required to maintain the Containment safety function.

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	
PWR Installed Equipment Phase 1	
As described previously in this report, the SEPS gensets will be utilized to power a station Emergency Bus early in the event response. Re-powering an Emergency Bus supports operation of the Service Water Cooling Tower as the backup ultimate heat sink which in turn supports operation of a spent fuel pool cooling pump and heat exchanger to maintain normal spent fuel pool temperature. Consequently, the spent fuel pool will never reach saturation conditions and only normal evaporative losses are expected to occur for the duration of the ELAP event. Additionally, Seabrook's below-grade spent fuel pool design facilitates gravity feed makeup to the SFP from the RWST if normal makeup from the Chemical & Volume Control System (CVCS) or the Demineralized Water system is unavailable.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Emergency Operating Procedure ES-0.1, 'Reactor Trip Response', directs the operators to restore spent fuel pool cooling flow using Abnormal Operating Procedure OS1215.07, 'Loss of Spent Fuel Pool Cooling or Level" [Ref. 31]. Revisions to a number of EOPs and AOPs is anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX guidelines and determine what procedural changes are necessary.
Identify modifications	No plant modifications are required to support the Spent Fuel Pool Cooling safety function.
Key SFP Parameter	Spent fuel pool wide range level instrumentation is being installed in compliance with Order EA-12-051. This instrumentation will be provided power from 'A' and 'B' Train class 1E vital distribution panels. Consequently, power to the instrumentation channel powered from Bus E6 will be restored from SEPS.

[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.

Maintain Spent Fuel Pool Cooling	
PWR Portable Equipment Phase 2	
As described previously in this report, the SEPS gensets will be utilized to power a station Emergency Bus early in the event response. Re-powering an Emergency Bus supports operation of the Service Water Cooling Tower as the backup ultimate heat sink which in turn supports operation of a spent fuel pool cooling pump and heat exchanger to maintain normal spent fuel pool temperature. Consequently, the spent fuel pool will never reach saturation conditions and only normal evaporative losses are expected to occur for the duration of the ELAP event. Additionally, Seabrook's below-grade spent fuel pool design facilitates gravity feed makeup to the SFP from the RWST if normal makeup from the Chemical & Volume Control System (CVCS) or the Demineralized Water system is unavailable.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	Emergency Operating Procedure ES-0.1, 'Reactor Trip Response', directs the operators to restore spent fuel pool cooling flow using Abnormal Operating Procedure OS1215.07, 'Loss of Spent Fuel Pool Cooling or Level" [Ref. 31]. Revisions to a number of EOPs and AOPs is anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX guidelines and determine what procedural changes are necessary.
Identify modifications	No plant modifications are necessary to support Phase 2 coping for the Spent Fuel Pool Cooling safety function.
Key SFP Parameter	Spent fuel pool wide range level instrumentation is being installed in compliance with Order EA-12-051. This instrumentation will be powered by a vital instrument bus and also has the capability of being powered from a portable power source, if necessary.
Storage / Protection of Equipment	
Seismic	Seismic protection of FLEX equipment was addressed previously in this report. The Spent Fuel Pool Cooling System equipment is contained within the seismic Cat-1 Fuel Storage Building (FSB).
Flooding	Flooding protection of FLEX equipment was addressed previously in this report. The Spent Fuel Pool Cooling System equipment is protected from

Maintain Spent Fuel Pool Cooling	
	the site design basis flood by the FSB.
Severe Storms with High Winds	Strategies to protect FLEX equipment from wind-driven missiles was addressed previously in this report. The Spent Fuel Pool Cooling System equipment is protected from wind-driven missiles by the FSB.
Snow, Ice, and Extreme Cold	Snow, Ice, and extreme cold protection of FLEX equipment was addressed previously in this report. The Spent Fuel Pool Cooling System equipment is protected from snow, ice, and extreme cold temperatures by the FSB.
High Temperatures	As noted previously, Seabrook Station 'screens out' from the high temperature hazard described in Section 9 of NEI 12-06.

Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	As noted previously, no plant modifications are necessary to maintain the Spent Fuel Pool Cooling safety function.	No connections to portable equipment are required to maintain the Spent Fuel Pool Cooling safety function.

Maintain Spent Fuel Pool Cooling	
PWR Portable Equipment Phase 3	
As previously described, Phase 3 spent fuel pool cooling coping consists of continued operation of the spent fuel pool cooling system. As previously described, in this phase of the response two - 2MW, 4.16 KV trailer-mounted generator from the RRC will be connected to the Emergency bus not being powered from SEPS. This will provide defense-in-depth by providing the flexibility to power spent fuel pool cooling equipment from the other Emergency Bus.	
Details	
Provide a brief description of Procedures / Strategies / Guidelines	As previously discussed, revisions to a number of EOPs and AOPs is anticipated. Seabrook will review the PWROG recommended procedure changes as well as the new draft FLEX guidelines and determine what procedural changes are necessary. No procedure changes are anticipated to support Phase 3 coping for the Spent Fuel Pool Cooling safety function.
Identify modifications	No plant modifications are required to implement Phase 3 coping for the Spent Fuel Pool Cooling safety function.
Key SFP Parameter	Spent fuel pool wide range level instrumentation is being installed in compliance with Order EA-12-051. This instrumentation will be powered by a vital instrument bus and also has the capability of being powered from a portable power source, if necessary.

Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	As noted previously, no plant modifications are necessary to maintain the Spent Fuel Pool Cooling safety function.	No connections to portable equipment are required to maintain the Spent Fuel Pool Cooling safety function.

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						Performance Criteria	Maintenance
List portable equipment	**Core**	**Containment**	**SFP**	**Instrumentation**	**Accessibility**		**Maintenance / PM requirements**
trailer-mounted fuel tank (transfer of fuel from EDG F.O. storage tanks to SEPS)	X		X	X	X	500-1000 gallon capacity. On-board suction pump to transfer fuel from EDG fuel oil storage tanks to trailer-mounted tank. On-board 75 foot suction hose for connection to tank drain line	To be determined

PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						Performance Criteria	Notes
List portable equipment	**Core**	**Containment**	**SFP**	**Instrumentation**	**Accessibility**		
Trailer-mounted diesel generators from RRC	X	X	X	X	X	Two - 2 MW, 4.16 KV with auto paralleling and load sharing capability	Connect to Emergency bus to provide SEPS redundancy and optimal event coping
Tanker truck of diesel fuel (from supplier outside 25 mile radius from plant)	X	X	X	X	X	20,000 gallons of diesel fuel	Periodic generator refueling supports Phase 3 long-term event coping
3-phase power cabling	X	X	X	X	X	250 feet	Standard 3-phase phase power cabling (individual conductors) with standard bolted terminal connections

Phase 3 Response Equipment/Commodities	
Item	Notes
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	
Commodities • Food • Potable water	
Fuel Requirements 20,000 gallons of diesel fuel in tanker truck (from supplier outside 25 mile radius from plant)	
Heavy Equipment • Transportation equipment • Debris clearing equipment	

Attachment 1A
Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [5]	Remarks / Applicability
	0	Event initiated with plant at 100% power after 100 days of EFP operation or shutdown in Mode 3 per plant procedures	NA	NEI 12-06 assumption
1	2 min	TD AFW pump starts	N	Actual time from EFW pump surv.
2	2 min	Both EDGs fail to start	N	NEI 12-06 assumption
3	5 min	Operating crew enters ECA-0.0	N	Transition from E-0 or direct entry to ECA-0.0
4	10 min	SEPS started and manually loaded on Emergency Bus E6 (or Bus E5 if E6 unavailable). Restore 'B' Train UHS by starting Cooling Tower pump	N	Action specified in ECA-0.0
5	30 min - 1 hour	Crew determines that an ELAP event is in progress - load sheds Emergency Bus to within capacity of one SEPS genset per ECA-0.0, Attachment 'A'	N	Restore UHS - SW and PCCW system flow. Action specified in ECA-0.0
6	2 hours > 12 hours	Conduct controlled cooldown and depressurization of the RCS - start time and cooldown rate based on available CST volume - start 'B' Train spent fuel pool cooling pump	N	Borate RCS. Cooldown rate determined by available CST water volume
7	12 hours > 24 hours	Place 'B' Train RHR system in service	N	Should be completed before CST depletion
8	24>72 hours	Connect two - 2 MW trailer-mounted EDGs from RRC to the Emergency Bus not being powered from SEPS	N	Provides 4.16KV backup to SEPS.
9	36>72 hours	Refuel SEPS gensets based upon fuel consumption rate. Once placed in operation, refuel 2 MW 4.16 KV DGs from RRC as necessary	Y	
10	>72 hours	Long-term coping established with plant in Mode 5 on RHR	N	Station focused on long-term coping

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

Attachment 1B
NSSS Significant Reference Analysis Deviation Table

The sequence of events and strategies described in this report deviate from the generic Westinghouse PWR case described in WCAP-17601 because power is restored to a 4.16 KV Emergency Bus using the SEPS gensets early in the event. This results in an early transition to Phase 2 coping for Seabrook. Seabrook's strategy also assumes the Service Water Cooling Tower is available as a backup ultimate heat sink in coping Phases 2 & 3. This allows long-term Phase 3 coping via the Residual Heat Removal System. Consequently, the Westinghouse generic analysis in the ERG Background Documents combined with the Seabrook Specific EOP Technical Guidelines Document (i.e., EOP step deviation document) [Ref. 30] constitute the analysis basis for the strategies described in this report.

Item	Parameter of interest	WCAP value (WCAP-17601-P August 2012 Revision 0)	WCAP page	Plant applied value	Gap and discussion

Attachment 2
Milestone Schedule

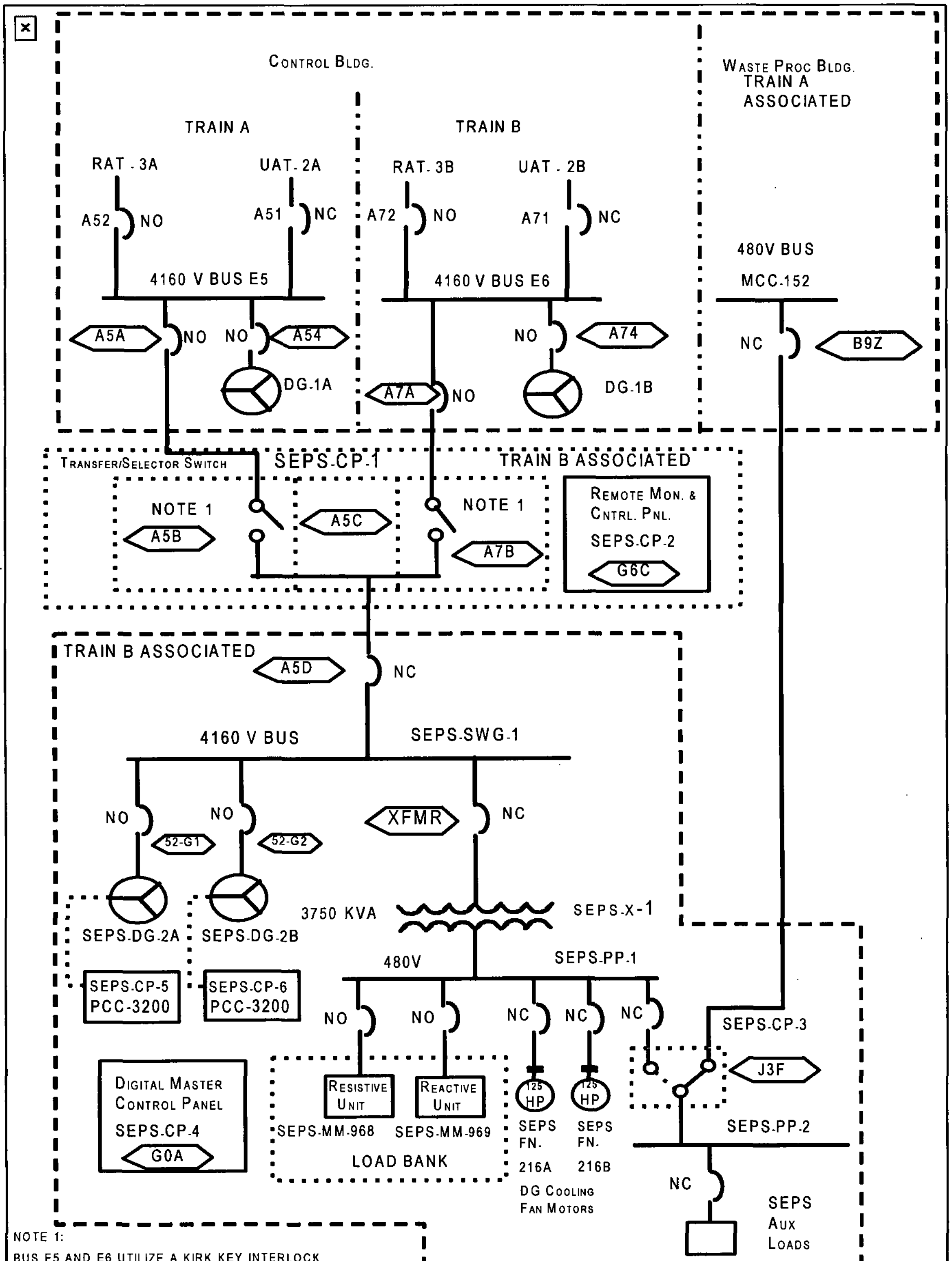
The following milestone schedule is provided. The dates are planning dates subject to change as design and implementation details are developed. Any changes to the following target dates will be reflected in the 6-month status reports.

Target Dates		Activity	Status / Remarks
Start	Complete		
	2/28/13	Submit Overall Integrated Implementation Plan to NRC	
2/13	12/13	Prepare engineering change packages for RCP low leakage seals and SEPS missile barrier	
	8/13	Submit 1st 6-month status report to NRC	
12/13	2/14	Prepare bid for construction of SEPS missile barrier	
	4/14	Install shutdown seals in two RCPs in Refueling outage #16	
3/14	12/14	Construct SEPS missile barrier	
1/14	12/14	Revise/ develop procedures based upon approved strategies and engineering implementation packages.	
	2/14	2nd 6-month update report to NRC	
6/14	12/14	Develop required training for station staff based upon draft procedures changes and Engineering change packages.	
	8/14	3rd 6-month update report to NRC	
9/14	12/14	Procure refueling trailer	
12/14	3/15	Develop PMs for refueling trailer	
	6/15	Store refueling trailer in SW pumphouse	
2/15	9/15	Implement training for station staff	
	2/15	4th 6-month update report to NRC	
	7/15	Fall 2015 Sites - RRC operational	
	8/15	final 6-month status report to NRC	
	10/15	Install remaining two shutdown seals in Refueling outage #17	
	11/15	Final Implementation - Order Full compliance letter to NRC	

Attachment 3
Diagrams and Photos

Figure 1 - Supplemental Emergency Power System (SEPS) Generators

Figure 2 - SEPS - Simplified Electrical One Line Diagram



NOTE 1:
BUS E5 AND E6 UTILIZE A KIRK KEY INTERLOCK WHICH ALLOWS ONLY ONE BREAKER TO BE RACKED IN AT ANY TIME. THE NON-SAFETY TRANSFER SWITCHES ARE INTERLOCKED WHICH ALLOWS ONLY ONE SWITCH TO BE CLOSED AT ANY ONE TIME

SEPS SIMPLIFIED
ELECTRICAL ONE LINE DIAGRAM

Figure 3 - Service Water Cooling Tower - Sectional View

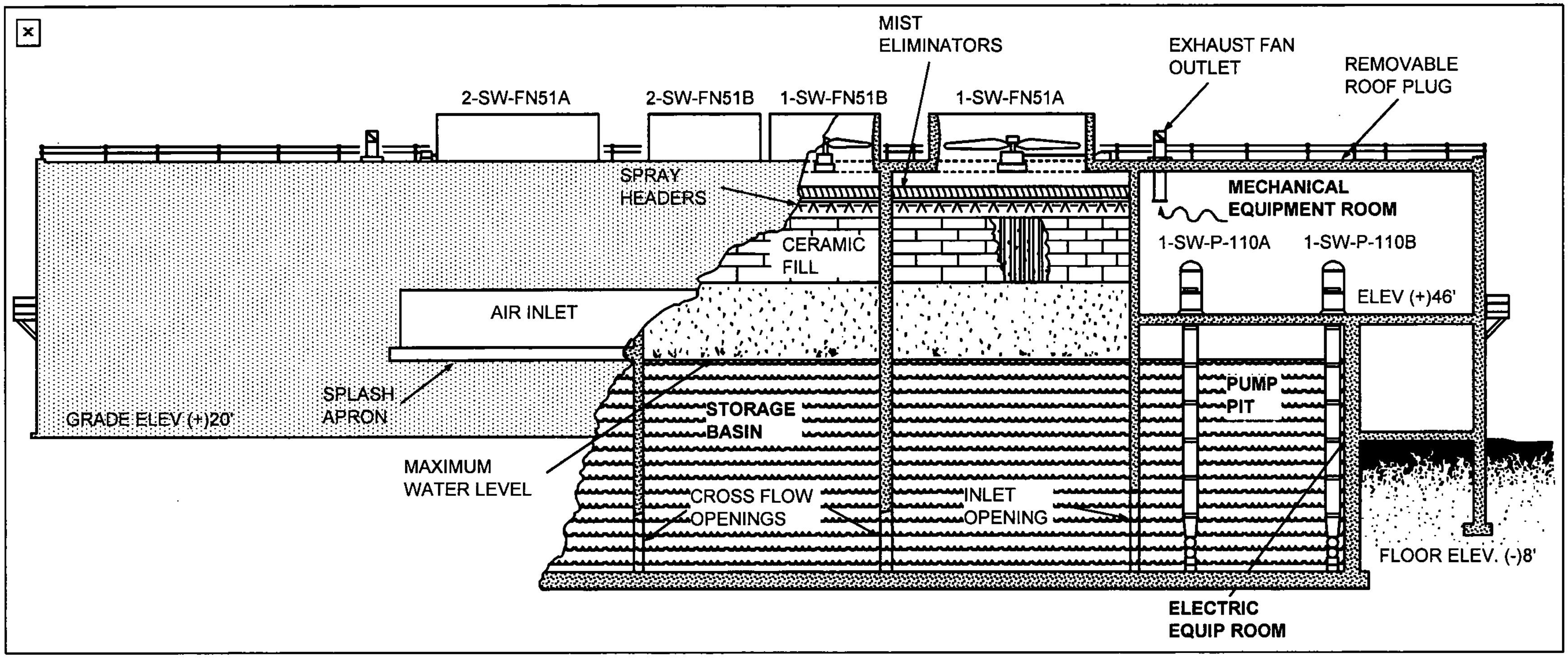


Figure 4 - Service Water System - Simplified One Line Diagram

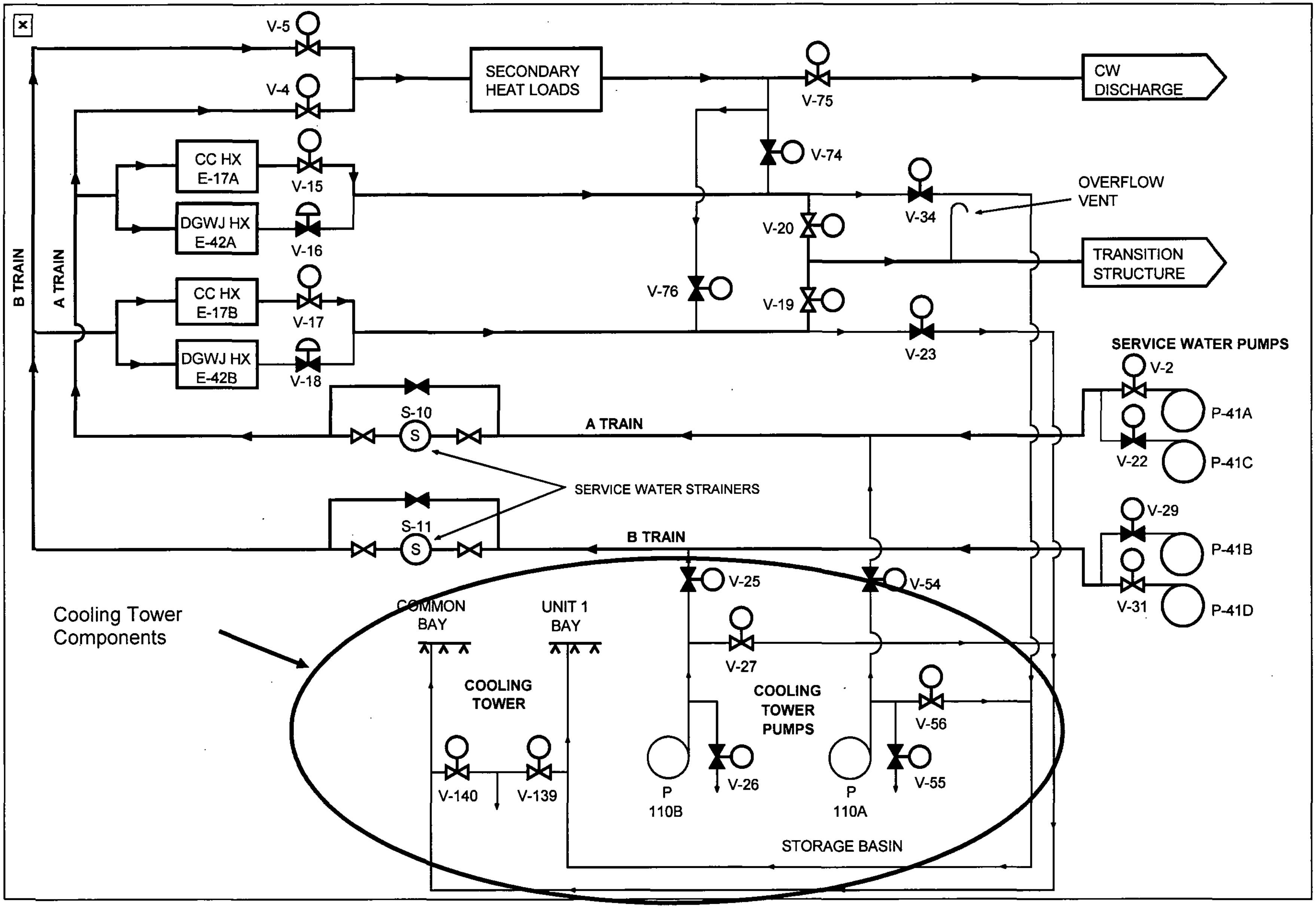


Figure 5 - EDG Fuel Oil Storage Tanks - Plan & Elevation Views

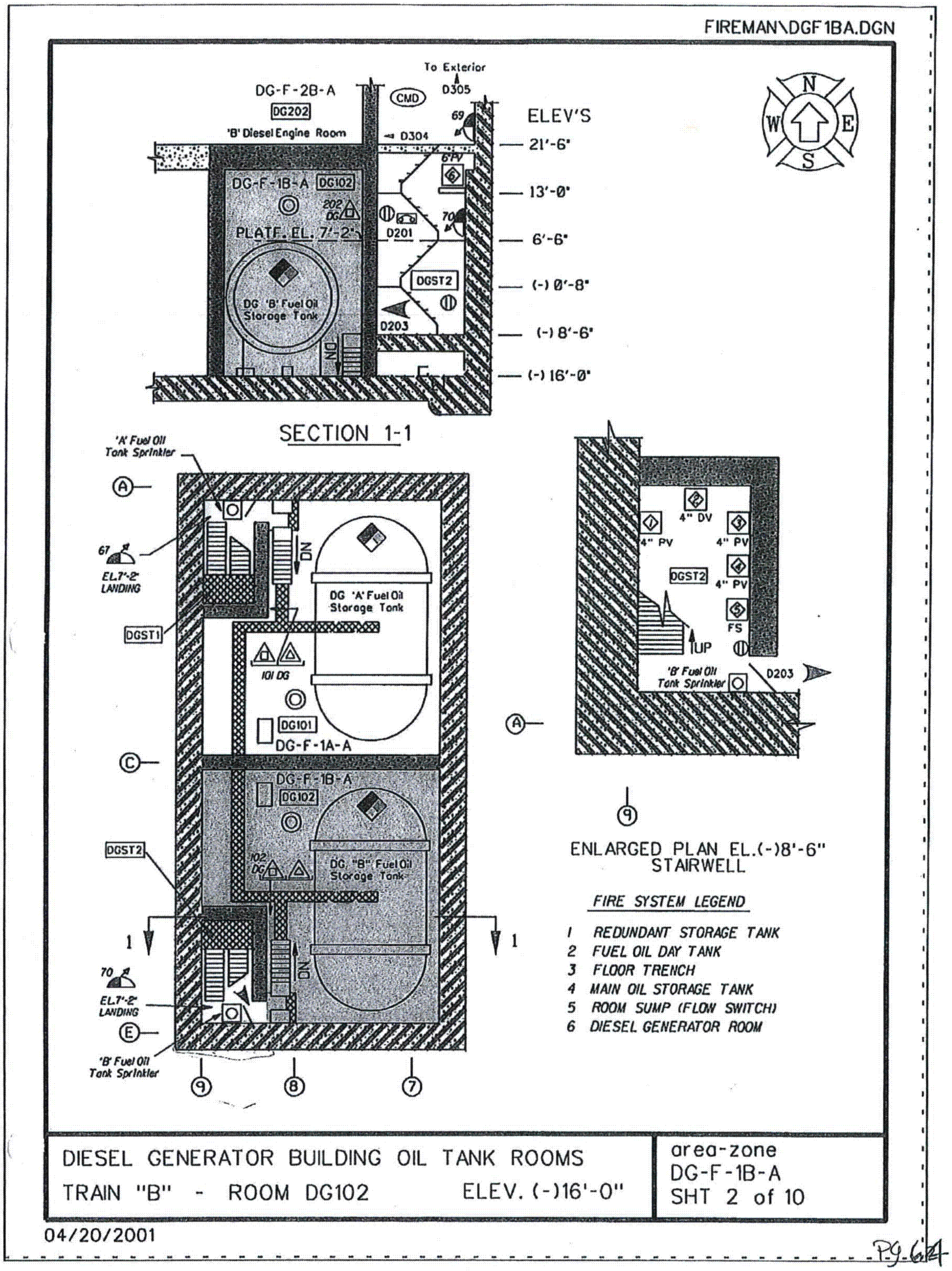


Figure 6 - Example Portable Refueling Trailer

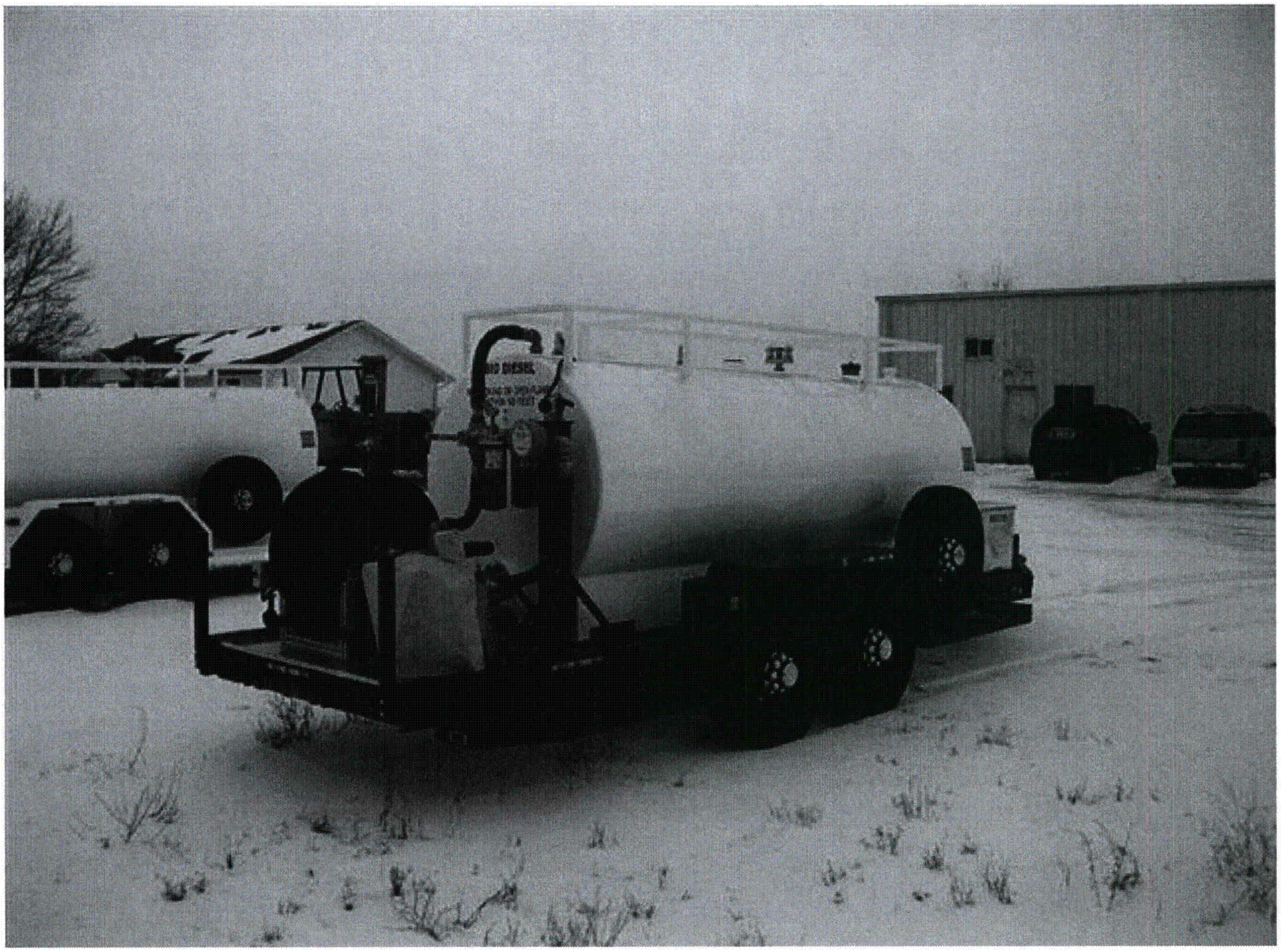


Figure 7 - Conceptual Drawing of Proposed Missile Barriers for SEPS

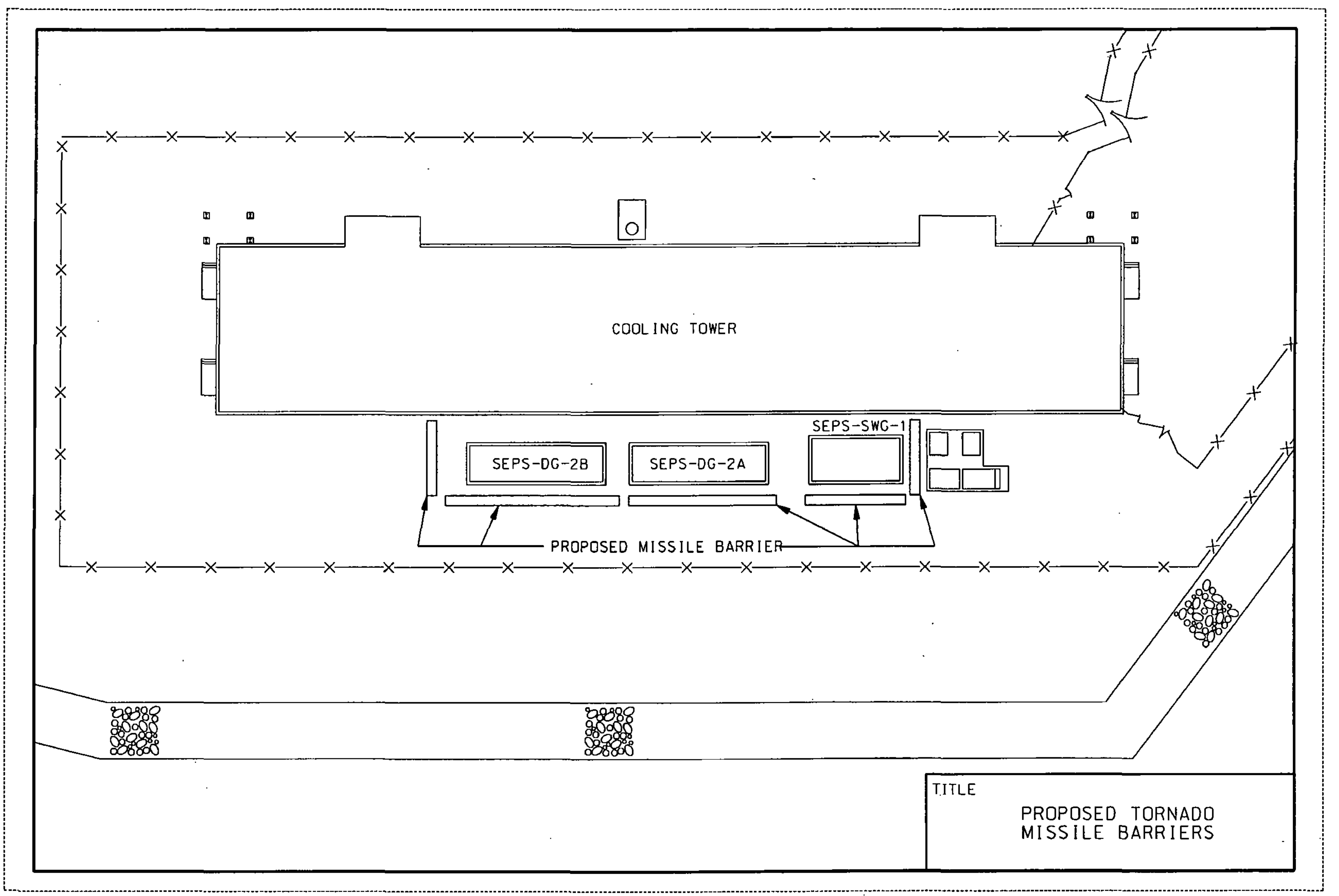


Figure 8 - RRC Generator Proposed Deployment Diagram

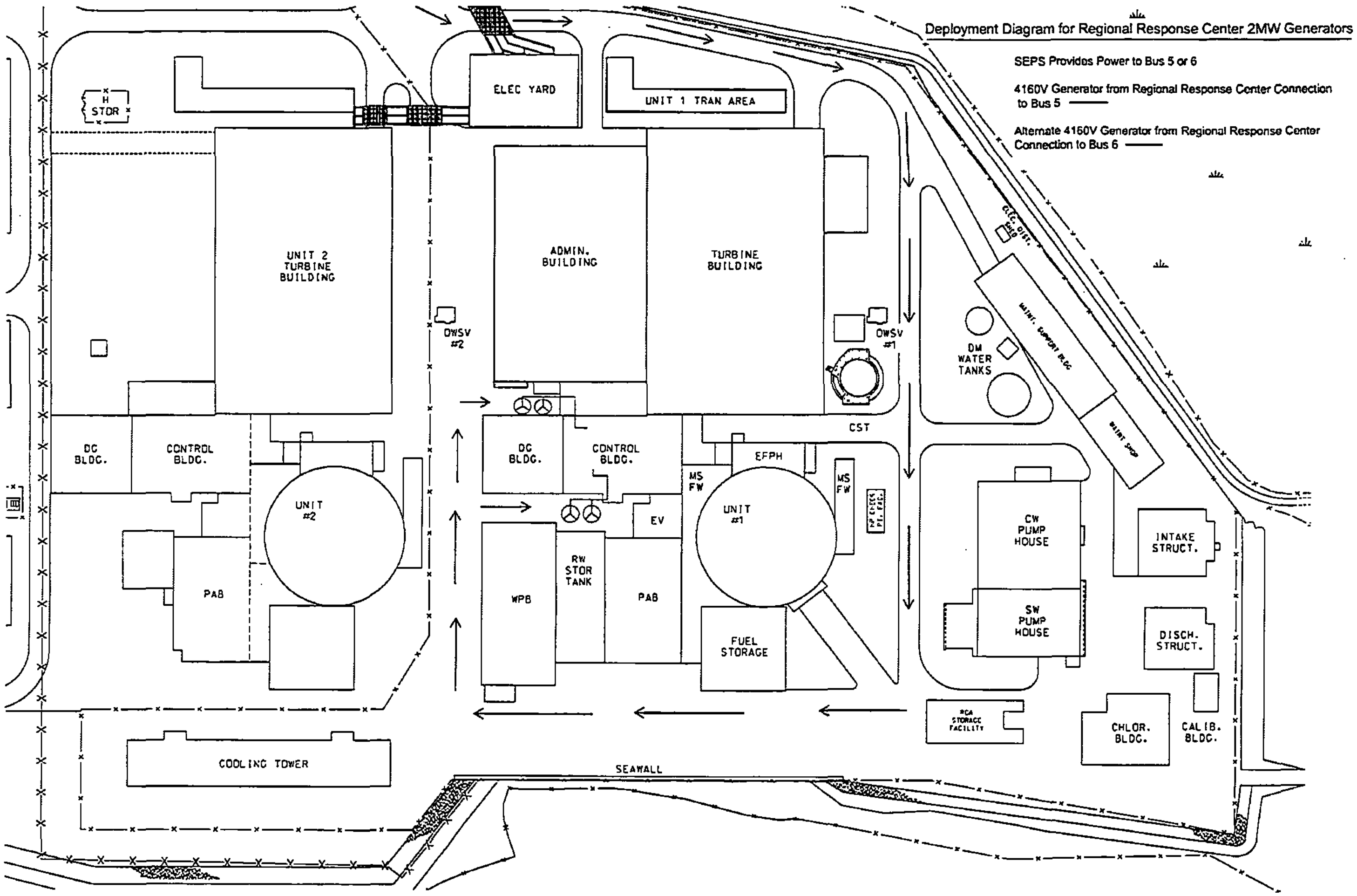
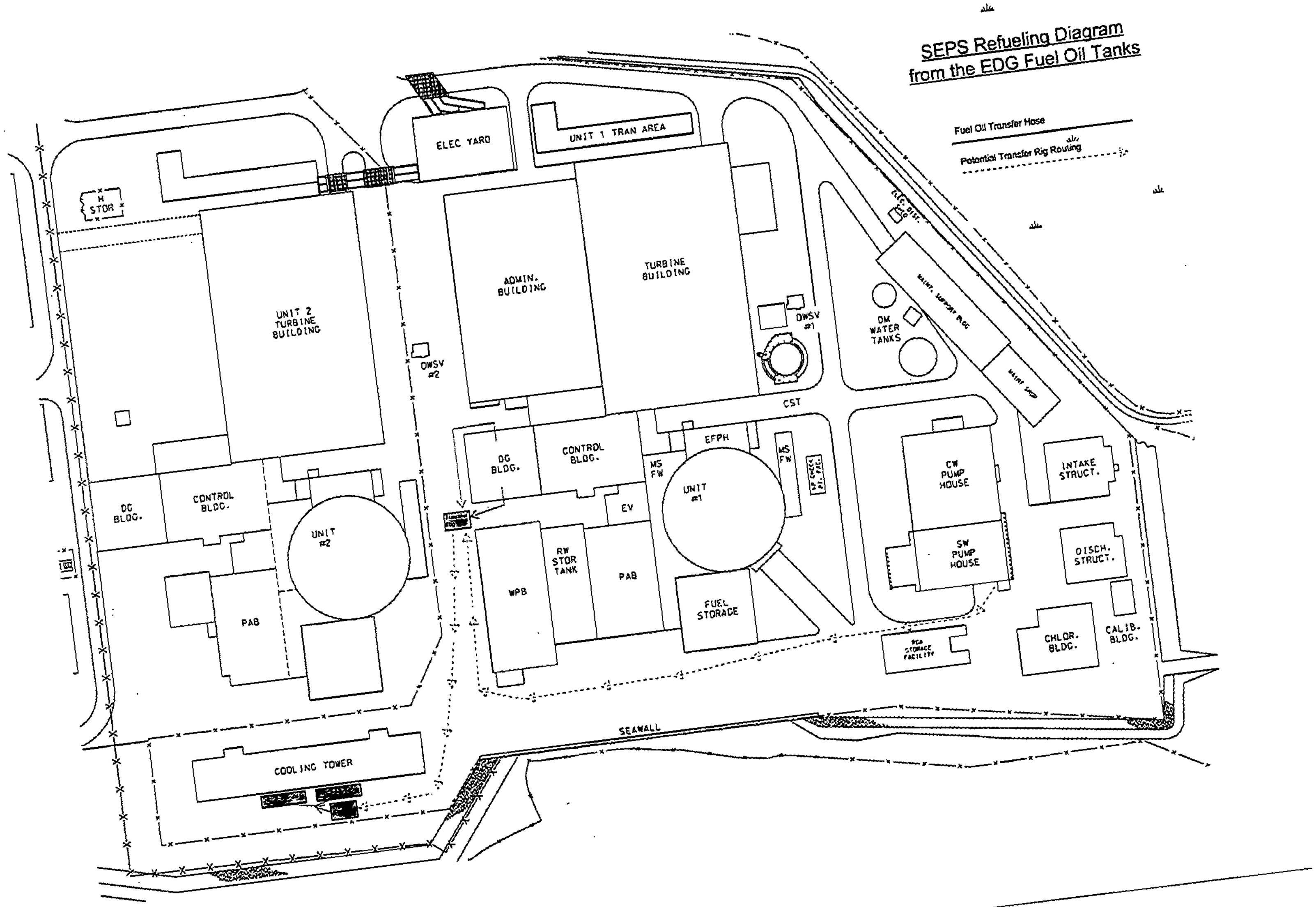


Figure 9 - Deployment Route for SEPS Re-fueling Trailer from SW Pumphouse



ATTACHMENT 4

Surveillance and Preventive Maintenance Information for SEPS and Service Water Cooling Tower Equipment

Surveillance Test Procedures

Procedure #	Description
OX1461.01	SEPS Full Load Testing Surveillance
OX1461.03	SEPS Operational Readiness Status Surveillance
OX1461.04	SEPS Monthly Availability Surveillance
OX1461.05	SEPS Annual Availability Surveillance
ON1416.11	Cooling Tower Portable Makeup Pump Semi-annual Diesel Run
OX1416.01	Monthly Service Water Valve Verification
OX1416.03	Monthly Cooling Tower Fan Operability Test
OX1416.05	Service Water Cooling Tower Pumps Quarterly & 2 Year Comprehensive Test
OX1416.06	Service Water Discharge Valves Quarterly Test and 18 Month Position Verification
OX1416.08	Cooling Tower Basin Temperature Weekly Surveillance
OX1416.09	Monthly Cooling Tower Portable Pump Operability Surveillance

Representative Sampling of PM Actions

PM #	Description
ED-SWG-5-IAC-6323	Alpha SEPS Type IAC Overcurrent and ground relay inspection
SEA-0015000	SEPS-DG-2-B Jacket water heater control panel inspection
SEPS-10.1-TR-Q2	SEPS diesel fuel oil tank 'A' (SEPS-TK-303A)
SEPS-B-2-A-E600-0003	SEPS DG 2A Quarterly battery PM
SEPS-B-2-A-E600-0012	SEPS DG 2A Monthly battery PM
SEPS-B-2-A-REPLACE	1-SEPS-B-2-A Replace starter batteries
SEPS-B-3-E600-0003	SEPS switchgear control battery and charger quarterly PM
SEPS-DG-2-A-L1	SEPS DG-2-A lube oil addition
SEPS-DG-2-A-L3	SEPS DG-2-A generator lube
SEPS-DG-2-A-L4	SEPS diesel engine crankcase oil sampling
SEPS-DG-2-A-M1	SEPS DG-2-A annual maintenance
SEPS-ENCL-INSP	SEPS hurricane enclosure inspection
SEPS-GLY-CJA-Q1	SEPS cooling jacket 'A'
SEPS-L-9652-A-FUNC-1	SEPS 2A fuel oil level switch inspection and alarm function test
SW-F-6163-CAL-1	F-6163 Cooling Tower loop 'A' SW return flow calibration
SW-FN-51-A-E320-0803	Cooling Tower Fan 4.16KV motor inspection & Feeder cable
SW-FN-51-A-L1	Cooling Tower draft fan gearbox lube oil change
SW-FN-51-A-L4	Fan gearbox oil sample
SW-P-110-A-L1	Cooling Tower pump motor oil change
SW-P-110-A-L4	Cooling Tower pump lube oil samples
SW-P-110-A-M1	Cooling Tower pump replacement
SW-P-110-AR900-1357	*Cooling Tower pump motor trip checks*
SW-P-110-A-IR	Cooling Tower pump thermographic inspection
SW-P-110-A-DYN-6434	SW-P-110-A Baker Testing (dynamic)
SW-P-TOWER-HD-CURVE	SW-P-110 Head curve verification
SW-TRN-A-FUNC-1	Cooling Tower Train 'A' actuation channel logic test
SW-T-6187-CAL-1	SW-P-110A, SW-P-110B, SW-FN-51A motor winding temp.

ATTACHMENT 5

Site Inventory of Vehicles and Heavy Equipment for BDBEE Debris Removal

Vehicle	ID #	Year	Make
3500 Dump Truck	50-205	2003	GMC
3500 Dump Truck	50-206	2003	GMC
3500 Dump Truck	50-215	2005	GMC
3500 Dump Truck	09-018	2009	GMC
4X4 1500 Pickup	06-004	2006	GMC
4X4 1500 Pickup	06-005	2006	GMC
4X4 1500 Pickup	06-006	2006	GMC
4X4 pickup	50-212	2004	GMC
4X4 pickup	50-213	2004	GMC
4X4 pickup	50-214	2004	GMC
4X4 pickup	06-012	2006	GMC
4X4 pickup	06-013	2006	GMC
4X4 pickup	07-002	2007	GMC
Aerial Van	06-001	2005	Ford
Aerial Van	50-184	1996	Ford
Box Truck	45-76	1996	Freightliner
Box Van	50-208	2004	GMC
Bucket Truck	07-001	2006	Ford
Crew Cab Pickup	06-002	2006	GMC
Expedition	08-004	2008	Ford
Expedition	08-005	2008	Ford
Expedition	OCA-10	2010	Ford
Expedition	OCA-11	2010	Ford
Expedition	OCA-12	2010	Ford
Rack Body	45-52	1986	GMC
Rack Body	45-53	1989	Ford
Rack Body	06-017	2006	HINO
Sierra	11-007	2011	GMC
Van	06-008	2006	GMC
Van	06-009	2006	GMC
Van	06-010	2006	GMC
Van	06-011	2006	GMC
Van	06-014	2006	GMC
Yukon	06-003	2006	GMC
Yukon	09-019	2009	GMC

ATTACHMENT 6

References

1. NEI 12-06, Rev. 0, 'Diverse and Flexible Coping Strategies (FLEX) Implementation Guide'. (docketed)
2. Seabrook Station Updated Final Safety Analysis Report (UFSAR). (docketed)
3. Seabrook Station Design Change packages: DCR 03-002, 'SEPS Phase 1', and DCR 03-015, 'SEPS Phase 2'.
4. Seabrook Station Design Basis Document DBD-SW-01, 'Service Water System' (Rev 6).
5. Seabrook Station Technical Specifications. (docketed)
6. NRC Interim Staff Guidance document 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'. (docketed)
7. Seabrook Station Technical Requirements Manual.
8. Abnormal Operating Procedure OS1246.01, 'Loss of Offsite Power - Plant Shutdown'.
9. Abnormal Operating Procedure OS1213.02, 'Loss of RHR While Operating at Reduced Inventory or Mid-loop Conditions'.
10. Abnormal Operating Procedure OS1200.03, 'Severe Weather Conditions'.
11. Emergency Operating Procedure ECA-0.0, 'Loss of All AC Power'.
12. WOG ERG Background Document for ECA-0.0,' Loss of All AC Power', HP Rev.2 dated April 30,2005.
13. Normal Operating Procedure OS1061.01, 'Operation of SEPS'.
14. Emergency Operating Procedure ES-0.1, 'Reactor Trip Response'.
15. WOG ERG Background Document for ES-0.1, 'Reactor Trip Response', HP Rev.2 dated April 30,2005.
16. Surveillance Test Procedure OX1436.13, Turbine Driven EFW Pump Post Cold Shutdown or Post Maintenance Surveillance and Comprehensive Pump Test'.
17. Normal Operating Procedure OS1036.03, 'Resetting the Steam Driven EFW Pump Trip Valve'.
18. Seabrook Station Design Basis Document DBD-EFW-01, 'Emergency Feedwater System' (Rev 6).
19. Normal Operating Procedure ON1042.01, 'Operation of the Compressed Air System'.
20. Normal Operating Procedure OS1090.01, 'Manual Operation of Remotely Operated Valves'.
21. Emergency Operating Procedure ES-02, 'Natural Circulation Cooldown.

22. WOG ERG Background Document for ES-0.2, 'Natural Circulation Cooldown', HP Rev.2 dated April 30,2005.
23. Seabrook Station Design Basis Document DBD-CC-01, 'Primary Component Cooling Water System', Rev. 4.
24. Emergency Operating Procedure ES-0.3, 'Natural Circulation Cooldown With Steam Void in Vessel (With RVLIS)'.
25. Emergency Operating Procedure ES-0.4, 'Natural Circulation Cooldown With Steam Void in Vessel (Without RVLIS)'.
26. WOG ERG Background Document for ES-0.3, 'Natural Circulation Cooldown With Steam Void in Vessel (With RVLIS)", HP Rev.2 dated April 30,2005.
27. WOG ERG Background Document for ES-0.4, 'Natural Circulation Cooldown With Steam Void in Vessel (Without RVLIS)", HP Rev.2 dated April 30,2005.
28. Normal Operating Procedure OS1013.04, 'RHR Train 'B' Startup and Operation'.
29. Stephenson & Associates report 11C4961-RPT-001, 'Review of Seismic Issues Related to GI-199", dated July, 2011.
30. Seabrook Specific EOP Technical Guidelines Document (i.e., EOP step deviation document).
31. Abnormal Operating Procedure OS1215.07, 'Loss of Spent Fuel Pool Cooling or Level'.
32. Operations Administrative Instruction OAI-10, 'Ordering and Receiving Fuel Oil and Chemicals'.
33. Severe Accident Management Guideline SAG-1, 'Inject Into the Steam Generators'.
34. Severe Accident Management Guideline SAG-3, 'Inject Into the RCS'.
35. Surveillance Test Procedure OX1461.01, 'SEPS Full Load Testing Surveillance'.
36. Task Interface Agreement (TIA) 2004-04, "Acceptability of Proceduralized Departures from Technical Specifications (TSs) Requirements at the Surry Power Station," (TAC Nos. MC4331 and MC4332)," dated September 12, 2006. (Accession No. ML060590273). (docketed).

ATTACHMENT 7

List of Pending Actions*

1. Revise ECA-0.0 to include a step to determine if an extended loss of offsite power event is in progress. This determination will delineate future procedural strategies and transitions.
2. Revise ECA-0.0, Attachment 'A' to include a Table of loads for an extended loss of offsite power event or create a new Attachment with this information.
3. An evaluation will be conducted on the non-seismic connections to the upper half of the CST to determine if Seabrook can take credit for the entire tank volume for Phase 1 & 2 event response.
4. Revise ECA-0.0 or ES-0.1 to add a step to manually shutdown the motor-driven EFW pump if the TDEFW pump is running satisfactorily. This reduces the loading on SEPS and maintains the pump in standby in the event a problem develops with the TDEFW pump.
5. Add an Attachment to ES-0.2, ES-0.3 and ES-0.4 that provides a Table of electrical loads for responding to an extended loss of offsite power event.
6. Develop a SEPS genset refueling strategy from 1) an offsite supplier outside a 25 mile radius from the station (primary strategy), and 2) the EDG fuel oil storage tanks using a refueling trailer stored in the SW Pumphouse (backup strategy).
7. Revise ES-0.2, ES-0.3, and ES-0.4 to include a step for implementation of a SEPS genset refueling strategy.
8. Develop a FSG for refueling SEPS from the EDG fuel oil storage tanks using a portable refueling trailer. Utilize the information contained in existing procedure OS1061.02, 'Receipt of SEPS Fuel Oil', for development of the FSG.
9. Revise ES-0.2, ES-0.3, and ES-0.4 to include direction for connecting the backup diesel-driven air compressor to the Service Air system to restore Instrument Air system pressure.
10. Develop required Preventive Maintenance actions and Surveillance test procedures for the refueling trailer to be procured and stored in the Service Water Pumphouse.
11. Revise OS1246.01, 'Loss of Offsite Power - Plant Shutdown', to address a reactor de-fueled condition ('Mode 7'). In that case restoration of spent fuel pool cooling is paramount as opposed to restoration of RHR cooling.
12. Conduct an Engineering Evaluation to determine if the existing hurricane enclosures for the SEPS gensets provide adequate missile protection. If protection is not adequate, develop a design change (EC) to add missile protection for the SEPS gensets.
13. Evaluate the 'seismic robustness' of SEPS and determine if enhancements are needed with respect to the new Ground Motion Response Spectrum (GMRS) data for the site. This data will not be available until the seismic hazard re-evaluation is conducted in accordance Recommendation 2.1 of the RFI letter.

14. Once the site flooding re-evaluation is completed in accordance with Recommendation 2.1 of the RFI letter, determine if additional flood protection is necessary for SEPS.
15. Formalize the Engineering assessment of ELAP load capacity for a single SEPS genset and modify procedural guidance in the applicable EOPs and AOPs, as necessary.
16. Evaluate the impact of missile protection barriers that may be installed to protect the SEPS gensets on the capability to implement the snow removal plan and revise the plan as necessary.
17. Determine if a quantity of diesel fuel will be provided from the Regional Response Centers along with requested Phase 3 portable equipment. If not, establish a contract with a fuel supplier outside a 25 mile radius from the plant to provide fuel within 48 hours of a BDBEE.
18. Develop a FSG for staging and deployment of Phase 3 equipment from the RRCs into the Protected Area.
19. Develop a FSG for connecting the 2MW generators from the RRC to 4.16 KV Emergency Busses E5 and E6.
20. Develop a FSG for refueling the RRC generators or incorporate this action into the SEPS refueling FSG.
21. Implement low leakage RCP seals on all four RCPs (vendor and design to be determined).
22. Based on PWROG guidance, determine if new FSGs are required that incorporate the existing guidance provided in SAG-1, 'Inject to the SGs', and SAG-3, 'Inject to the RCS' or whether transition points to these two SAMGs should be added to the applicable EOPs.

*Status of Pending Actions will be provided in the 6-month update reports required by Order EA-12-049.

ATTACHMENT 8

Technical Descriptions of SEPS and the Service Water Cooling Tower

Supplemental Emergency Power System (SEPS)

Seabrook Station is a 4-hour AC-independent coping plant with respect to a site blackout event. SEPS is a non safety-related backup power system that is not currently credited as a 'site blackout diesel' or an 'alternate AC source', and is also not credited in the UFSAR accident analyses. The station's 4-hour coping time is not impacted by the availability of SEPS.

SEPS consists of two air-cooled, 2640 KW (net rated load), 4.16kV diesel generating sets (gensets), that can be manually aligned to either 4.16kV Emergency Bus (Bus E6 preferred). This meets the alternate connection criterion of NEI 12-06 (see Figures 1 & 2 in Attachment 3).

The SEPS gensets are pre-positioned FLEX equipment for the strategies described in this report. Because the gensets are redundant they meet the N+1 equipment quantity criterion for FLEX portable equipment prescribed in NEI 12-06.

Both SEPS gensets are seismically robust and installed above the current site licensing basis flood plain. The genset enclosures are designed to protect them from, at minimum, 120 mph hurricane force winds. SEPS is not currently provided with wind-driven missile protection beyond these weather-proof enclosures.

Each SEPS genset has fuel capacity for greater than 24 hours of operation at rated load. Preliminary analysis indicates that either of the redundant gensets has the capacity to power required ELAP loads. Consequently, an Emergency bus can be powered for longer than 48 hours with the fuel supply contained in both gensets.

Service Water Cooling Tower

NEI 12-06 assumptions include loss of normal access to the Ultimate Heat Sink (UHS). In Seabrook's case that would be the train-related ocean service water pumps in the Service Water Pumphouse.

The Service Water Cooling Tower is a safety-related standby ultimate heat sink that is part of station design. The Cooling Tower is a seismic Cat-1 structure that is flood and missile protected. Its function is to provide cooling water to the safety-related Service Water system should a seismic event partially collapse the intake and/or discharge cooling water tunnels to the Atlantic Ocean.

The Cooling Tower consists of a large basin of fresh/brackish water (approx. 4 million gallons), two train-related cooling tower pumps, and three train-related forced draft fans. The basin is significantly over-sized as it was designed for two units and only Unit 1 was completed at Seabrook Station (see Figures 3 & 4 in Attachment 3).

Cooling Tower design can support 7 days of post-Loss of Coolant Accident (LOCA) heat load operation before basin makeup is required. The ELAP heat load is smaller than the postulated post-LOCA heat load, therefore a longer period of Cooling Tower operation is expected before basin makeup would be required.

Basin makeup is normally provided from the potable water system or the station firemain. Makeup can also be provided by a Technical Specification-required portable diesel-driven pump that is pre-staged in the seismic Cat-1 Service Water Pumphouse [Ref. 5].