Dominion Nuclear Connecticut, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
Web Address: www.dom.com

Dominion®

February 28, 2013

10 CFR 2.202
EA-12-049

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

Serial No.: 12-161B
NL&OS/MAE: R2
Docket Nos.: 50-336/423
License Nos.: DPR-65
NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNITS 2 AND 3
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)

Reference:

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
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
4. Dominion Nuclear Connecticut, Inc.'s Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated October 25, 2012 (Serial No. 12-161A)

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

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

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Reference 4 provided the DNC initial status report regarding mitigation strategies, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plans pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms DNC has received Reference 2 and has an Overall Integrated Plans 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 Overall Integrated Plans for Millstone Units 2 and 3 are provided as Enclosures 1 and 2, respectively, to this letter.

The information in the enclosures provides the DNC Overall Integrated Plan for mitigation strategies pursuant to Reference 3. The enclosed Integrated Plans are based on conceptual design information. Final design details and associated procedure guidance, as well as any revisions to the information contained in the enclosures, will be provided in the 6-month Integrated Plan updates required by Reference 1.

If you have any questions, please contact Ms. Margaret Earle at (804) 273-2768.

Sincerely,

David A. Heacock
President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.

Enclosures

Commitments made by this letter: No New Regulatory Commitments

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by David A. Heacock who is President and Chief Nuclear Officer of Dominion Nuclear Connecticut, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of the Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 28TH day of February, 2013.

My Commission Expires: May 31, 2014.

Vicki L. Hull
Notary Public

(SEAL)

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140542
My Commission Expires May 31, 2014

cc: Director of Office of Nuclear Reactor Regulation (w/o Enclosures)
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 13H16M
11555 Rockville Pike
Rockville, MD 20852-2738

U. S. Nuclear Regulatory Commission, Region I
Regional Administrator
2100 Renaissance Blvd.
Suite 100
King of Prussia, PA 19406-2713

Mr. J. S. Kim
NRC Project Manager Millstone Units 2 and 3
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O8 C 2A
11555 Rockville Pike
Rockville, MD 20852-2738

Ms. J. A. Kratchman
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop O9 D2
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Millstone Power Station

Enclosure 1

Millstone Unit 2 Overall Integrated Plan

Mitigation Strategies For Beyond-Design-Basis External Events

Millstone Power Station

Dominion Nuclear Connecticut, Inc.

Table of Contents

Table of Contents

List of Tables

List of Attachments

List of Attachments (cont.)

LIST OF ACRONYMS

AC	Alternating Current
AFW	Auxiliary Feedwater
AOT	Allowed Outage Times
AP	Abnormal Procedure
ATWS	Anticipated Transient Without Scram
BDB	beyond-design-basis
CFR	Code of Federal Regulations
CBO	Control Bleed Off
CR	Control Room
CST	Condensate Storage Tank
DC	Direct Current
DG	Diesel Generator
ELAP	Extended Loss of AC Power
EOC	End of Cycle
EPRI	Electric Power Research Institute
FLEX	Diverse and Flexible Coping Strategies
FSAR	Final Safety Analysis Report
FSG	FLEX Support Guidelines
HELB	High Energy Line Break
INPO	Institute of Nuclear Power Operations
LOOP	Loss of Off-Site Power
LUHS	Loss of normal access to the Ultimate Heat Sink
MCR	Main Control Room
MPS	Millstone Power Station
MPS2	Millstone Power Station Unit 2
MPS3	Millstone Power Station Unit 3
MSL	Mean Sea Level
NEI	Nuclear Energy Institute
NOAA	National Oceanic and Atmospheric Administration
NR	Narrow Range
OBE	Operating Basis Earthquake
PA	Protected Area
PEICo	Pooled Equipment Inventory Company
PMP	Probable Maximum Participation
PWROG	Pressurized Water Reactors Owners Group
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RRC	Regional Response Center

LIST OF ACRONYMS

RVLIS	Reactor Vessel Level Indication System
RWST	Refueling Water Storage Tank
SAFER	Strategic Alliance for FLEX Emergency Response
SAT	Systematic Approach to Training
SBO	Station Blackout
SFP	Spent Fuel Pool
SG	Steam Generator
SSE	Safe Shutdown Earthquake
TDAFW	Turbine Driven Auxiliary Feedwater
TS	Technical Specification
UHS	Ultimate Heat Sink
VAC	Volts Alternating Current
VDC	Volts Direct Current
WR	Wide Range

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A. General Integrated Plan Elements

<table>
<tr>
<td>A.1 - Determine Applicable Extreme External Hazard

Ref: NEI 12-06 section 4.0 -9.0
JLD-ISG-2012-01 section 1.0</td>
<td>Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps.
Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant screened out for certain hazards.

The design basis of Millstone Power Station Unit 2 (MPS2) provides protection against a broad range of external hazards. A site-specific assessment for Millstone provides the development of strategies, equipment lists, storage requirements, and deployment procedures for the conditions and consequences of the following five classes of external hazards:
Seismic events
External flooding
Storms such as hurricanes, high winds, and tornadoes
Snow and ice storms, and cold
Extreme heat
<u>Seismic events</u>
The MPS2 seismic hazard is considered to be the earthquake magnitude associated with the design basis seismic event. Per Final Safety Analysis Report (FSAR) Section 5.8.1.1, the safe shutdown earthquake (SSE) produces a maximum horizontal ground acceleration of 0.17g and a vertical ground acceleration of 0.11g. The operating basis earthquake (OBE) used in the plant design is based on ground motion having a maximum horizontal acceleration of 0.09g and a vertical acceleration of 0.06g, acting simultaneously.

For the flexible and diverse coping strategies (FLEX), the earthquake is assumed to occur without warning and result in damage to non-seismically designed structures and equipment. Non-seismic structures and equipment may fail in a manner that would prevent accomplishment of FLEX-related activities (normal access to plant equipment, functionality of non-seismic plant equipment, deployment of beyond design basis (BDB) equipment, restoration of normal plant services, etc.)</td>
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	<u>External flooding</u> Millstone Power Station (MPS) is located on the north shore of Long Island Sound. To the west of the site is Niantic Bay and to the East is Jordon Cove. The only sources of flooding that could affect MPS are direct rainfall and storm surge. There are no major rivers or streams in the vicinity of the station, nor are there any watercourses on the site. A number of small brooks flow into Jordan Cove, east of the site, and into the Niantic River and thence to Niantic Bay, west of the site. Any flooding of these brooks, even as a result of the probable maximum precipitation (PMP), would not significantly raise the water levels of any body of water in the vicinity of the site. Additionally, in each area, local topography precludes flooding of any portion of the site from the landward side. Since there are no major rivers or streams in the vicinity of the station, the effects of potential dam failures, seismically induced, are not applicable. Since MPS is located on a peninsula projecting into Long Island Sound, it is subjected to tidal flooding from severe storms. The highest such flooding has resulted from the passage of hurricanes. The design of MPS2 reflects the decision to provide flood protection up to Elevation 22 feet mean sea level (MSL) minimum for the Containment, Turbine, and Auxiliary Buildings. This is based on the MPS2 Licensing Basis that states for a probable maximum hurricane, the maximum still water level was determined to be +19.17 feet MSL with an associated 2.5 feet of wave run-up to an elevation of +21.67 feet MSL. Most safety-related equipment is protected from flooding by closing flood gates/stop logs and other operator actions taken in anticipation of flooding at the site. All penetrations into the Auxiliary and Turbine Buildings are provided with hinged flood gates or stop logs to Elevation 22 feet MSL. The poured concrete wall of the Auxiliary and Turbine Buildings are to Elevation 22 feet MSL. However, Millstone Power Station Unit 3 (MPS3) has a slightly higher Licensing Basis flood level of 19.7 feet MSL stillwater, with a wave run-up to Elevation 23.8 MSL. Per Nuclear Energy Institute (NEI) 12-06, Section 6.2.3.1, “site” flood characteristics must be considered. Therefore, the more limiting MPS3 flood characteristics are applied to the MPS2 FLEX strategy development.

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	The service water pumps and motors are located in a structure at Elevation +14.5 feet MSL. The service water pumps are protected to a 22-foot elevation in the pumphouse, and provisions to protect a single service water motor up to 28 feet are initiated when significant flood surges are anticipated. The front wall of the intake structure extends to Elevation 43 feet MSL, and is designed to withstand the forces of a standing wave or clapotis with a crest elevation of 41.2 feet MSL. The effect of local intense precipitation has been evaluated for existing structures containing safety-related equipment. It was concluded that all the safety-related structures and equipment are capable of withstanding the PMP without loss of safety-related functions (MPS2 FSAR Section 2.5.4.2 and MPS3 FSAR Section 2.4.1). The areas of the North American continent most susceptible to tsunamis are those bordering the Pacific Ocean and the Gulf of Mexico. MPS is located on the North Atlantic coastline where there is an extremely low probability of tsunamis (MPS3 FSAR Section 2.4.6). Therefore, tsunamis are not considered to be credible natural phenomena which might affect the safety of either unit at the MPS site. Flooding due to ice jams is not a possibility since the site is not on a river. Seiche-related flooding is not addressed in the FSAR. Storms such as hurricanes, high winds, and tornadoes Plant design bases address the storm hazards of hurricanes, high winds and tornadoes. Strong winds, usually caused by intense low-pressure systems, tropical cyclones, or passages of strong winter frontal zones, occasionally affect the region. MPS is located on the north shore of the Long Island Sound. As such, it is exposed to tropical storms and hurricanes coming off the Atlantic Ocean. Storms of tropical origin occasionally affect the region during the summer and fall months. According to a statistical study by Simplon and Lawrence (1971), the 50-mile segment of coastline on which MPS is located, was crossed by five hurricanes during the 1886 to 1970 period. Based on observations from Montauk Point (located about 23 miles southeast of MPS on the eastern tip of Long

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	Island), the maximum reported wind speed in the region was associated with the passage of a hurricane during which sustained winds of 115 mph, with short-term gusts up to 140 mph (Dunn and Miller 1960) were observed. For the period from 1961 through 1990, the "fastest-mile" wind speed recorded at Bridgeport was 74 mph occurring with a south wind in September 1985 (MPS3 FSAR Section 2.3.1.2). According to MPS3 FSAR Section 2.3.1.2.4, a study of tornado occurrences during the period of 1955 through 1967 (augmented by 1968-1981 storm data reports), the mean tornado frequency in the one-degree (latitude-longitude) square where the MPS site is located is determined to be approximately 0.704 per year (MPS3 FSAR Section 2.3.1.2). MPS2 uses a design basis tornado wind velocity of 360 mph (MPS2 FSAR Section 5.2.2.1.6). <u>Snow and ice storms, and cold</u> The climatology of the MPS site may be reasonably described by the data collected by the National Weather Service at Bridgeport, CT. Measurable snowfall has occurred in the months of November through April, although heavy snowfall occurrences are usually confined to the months of December through March. The mean annual snowfall at the present Bridgeport location is 25.3 inches, with totals since 1932 ranging from 8.2 inches in the 1972-1973 season, to 71.3 inches in the 1933-1934 season. The maximum monthly snowfall, occurring in February 1934, was 47.0 inches. Since 1949, both the maximum measured snowfall in 24 hours (16.7 inches), and the greatest snowfall in one storm (17.7 inches) occurred during the same storm in February 1969. The maximum measured snowfall in 24 hours (16.7 inches) was matched again in January 1978 (MPS3 FSAR Section 2.3.1). Note that according to the National Weather Service, the measured snowfall during the most recent winter storm of February 8-9, 2013 at the Bridgeport location was 30 inches. Freezing rain and drizzle are occasionally observed during the months of December through March, and only rarely observed in November and April. An average of 18.5 hours of freezing rain and 8.5 hours of freezing drizzle occur annually in the region. In the 32-year period, 1949-1980, all

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	cases of freezing precipitation were reported as light (less than 0.10 inch per hour), except for one hour of moderate (0.10 to 0.30 inch per hour) precipitation (MPS3 FSAR Section 2.3.1). Winters are moderately cold, but seldom severe. Minimum daily temperatures during the winter months are usually below freezing, but subzero (deg F) readings are observed, on the average, less than one day every two years. Below zero temperatures have been observed in each winter month, with an extreme minimum of -20 deg F occurring in February 1934 (National Oceanic and Atmospheric Administration (NOAA) 1971, 1990) (MPS3 FSAR Section 2.3.1). <u>Extreme heat</u> Due to the proximity of Long Island Sound and the Atlantic Ocean, the heat of summer is moderated. Temperatures of 90 deg F or greater occur an average of seven days per year at Bridgeport, while temperatures of 100 deg F or greater have occurred only in July and August; with an extreme maximum of 104 deg F occurring in July 1957 (NOAA 1990) (MPS3 FSAR Section 2.3.1).
A.2 - Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • *Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes.* • *Exceptions for the site security plan or other (license/site specific) requirements of 10 CFR may be required.* • *Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours.* • *Certain Technical Specifications cannot be complied with during FLEX implementation.*

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	Key assumptions associated with implementation of FLEX strategies: • Flood and seismic re-evaluations pursuant to Title 10 of the Code of Federal Regulations (10 CFR) 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes. • Exceptions for the site security plan or other (license/site specific) requirements of 10 CFR may be required. • Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours. • This plan defines strategies capable of mitigating a simultaneous Extended Loss of AC Power (ELAP) and Loss of Normal Access to the Ultimate Heat Sink (LUHS) resulting from a BDB event by providing adequate capability to maintain or restore core cooling, containment, and Spent Fuel Pool (SFP) cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures (EOPs) in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications (TSs) contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the BDB event may place the plant in a condition of noncompliance with certain TSs and/or with the Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). This position is consistent with the previously documented 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). Boundary conditions are established to support development of FLEX strategies, as follows: • The BDB external event occurs impacting both units at the site. • The reactor is initially operating at power, unless there are procedural requirements to shut down due to the impending event. The reactor has been operating at 100% power for the past 100 days. • The reactor is successfully shut down when required (i.e., all rods inserted, no Anticipated Transient Without Scram (ATWS). Steam release to maintain decay heat removal upon shutdown functions normally, and reactor coolant system (RCS) overpressure protection valves respond normally, if required by plant conditions, and reseat. • On-site staff is at site administrative minimum shift staffing levels. • No independent, concurrent events (e.g., no active security threat). • All personnel on-site are available to support site response. • The reactor and supporting plant equipment are either operating within normal ranges for pressure, temperature and water level, or available to operate, at the time of the event consistent with the design and licensing basis. The following plant initial conditions and assumptions are established for the purpose of defining FLEX strategies: • No specific initiating event is used. The initial condition is assumed to be a loss of off-site power (LOOP) with installed sources of emergency on-site alternating current (AC) power and station blackout (SBO) alternate AC power sources unavailable with no prospect for recovery. • Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, floods, and high

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	winds and associated missiles are available. Permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, and high winds and associated missiles, are available. • The fire protection system ring header is not relied upon as a water source since it is not considered to be robust with respect to seismic events. • Normal access to the ultimate heat sink (UHS) is lost, but the water inventory in the UHS remains available and robust piping connecting the UHS to plant systems remains intact. The motive force for UHS flow, i.e., pumps, is assumed to be lost with no prospect for recovery. • Fuel for BDB equipment stored in structures with designs that are robust with respect to seismic events, floods and high winds and associated missiles, remains available. • Installed Class 1E electrical distribution systems, including inverters and battery chargers, remain available since they are protected. • No additional accidents, events, or failures are assumed to occur immediately prior to or during the event, including security events. • Reactor coolant inventory loss consists of unidentified leakage at the Technical Specifications limit, reactor coolant letdown flow (until isolated), and reactor coolant pump (RCP) seal leak-off at normal maximum rate. • For the SFP, the heat load is assumed to be the maximum design basis heat load. In addition, inventory loss from sloshing during a seismic event does not preclude access to the pool area.
A.3 - Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01 NEI 12-06 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* The MPS2 FLEX Program will fully implement the guidance of NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" and 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." There are no known deviations to the guidance.

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A.4 - Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7 JLD-ISG-2012-01 section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walk through of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A* *See attached sequence of events timeline (Attachment 1A).* *Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B)* The sequence of events timeline is provided in Attachment 1A. Preliminary estimates of response times have been developed based on plant simulator runs and table-top walkthroughs of planned actions. A two-hour duration is assumed for deployment of equipment from the BDB storage Building(s), based on a "sunny day" validation for implementation of 10 CFR 50.54(hh)(2) time sensitive actions. The validation included deploying a portable high capacity pump from its storage location to a location near the Long Island Sound (staging location) and routing hoses to provide flow to the SFP. Time to clear debris to allow equipment deployment is assumed to be 2 hours, and will depend on the location of the BDB Storage Building(s). This time is considered to be reasonable based on site reviews and proposed locations of the BDB Storage Building(s). Debris removal equipment will be stored in the BDB Storage Building(s). Validation of estimated response times included in Attachment 1A will be completed once FLEX support guidelines (FSGs) have been developed and will include a staffing analysis. **[Open Item 1]** The following items correspond to time constraint Action Items listed in Attachment 1A: <u>Action Item 7:</u> Direct current (DC) load stripping completed – 75 minutes Plant-specific analysis for extension of Class 1E battery life

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	assumed that stripping of non-critical DC bus loads would be complete within 75 minutes of the occurrence of a loss of all AC power. With completion of load stripping in 75 minutes, the Class 1E battery life was calculated to be 19 hours (Reference ETE-CEE-2012-1001). Within 45 minutes of the initiating event, an ELAP condition would be diagnosed and DC bus load stripping would be initiated. Load stripping is required to be completed within 30 minutes. The vital 120 Volts Alternating Current (VAC) panels and 125 VDC panels required to be accessed by the operator to perform load stripping are located in the "A" and "B" DC switchgear rooms. The panels are readily accessible based on the close proximity to the normal duty station for the operator assigned this action and load stripping is an uncomplicated task requiring opening the distribution panel door and opening the specified breakers. Therefore, completing the load stripping action within 30 minutes is reasonable, and the 75 minute time constraint can be met. Load stripping is discussed further in Section F1.1. <u>Action Item 8:</u> Control Auxiliary Feedwater (AFW) flowrate to Steam Generators (SGs) to prevent overfill – 2.6 hours The procedure for SBO provides direction to start the turbine driven auxiliary feedwater (TDAFW) pump and close the RCS isolation valves. At MPS2, the TDAFW pump is aligned to supply water from the condensate storage tank (CST) to both SGs. Throttling of the AFW valves is needed to prevent overfilling of the SGs. Analysis shows that this action is required within 2.6 hours after the TDAFW pump is started (Reference MISC-11787 **[Open Item 2]**). Therefore, throttling of AFW flow to the SGs within 2.6 hours is a time constraint. Operators would be assigned within the first 15 minutes of the event to control flow in order to maintain proper SG level. The throttling would be performed locally using the AFW regulating valves or their bypass valves at the TDAFW pump. Operators could reach the area in less than 5 minutes to begin to control AFW flow in order to maintain SG levels. Thus, SG level control could be accomplished in less than 2.6 hours. See Section B for a discussion of AFW operation.

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	Action Item 10: Deploy BDB High Capacity pump to barge slip and initiate flow from Long Island Sound – 7.2 hours The CST has sufficient volume to provide AFW for 7.2 hours, at which time a supplemental supply of AFW is required (Reference Calculation MISC-11787 **[Open Item 2]**). The 7.2 hours is a time constraint to provide a supplemental AFW source. The credited supplemental source of AFW is water from Long Island Sound. To supply makeup to the CST from the Long Island Sound, a BDB High Capacity pump or a fire truck will be positioned at the barge slip pulling a draft off the sound. A temporary hose would be run to the CST to provide a supplemental source of AFW. Deployment assumes 2 hours for debris removal, and an additional 2 hours to transport the BDB High Capacity pump to the deployment location (barge slip) and route temporary hoses to the CST. Therefore, providing a supplemental source of AFW will be accomplished within the time constraint of 7.2 hours. See Section B for a discussion of AFW operation. Note: Flooding due to a hurricane could delay deployment of the BDB High Capacity pump (or fire truck) to provide makeup to the CST. Existing procedures direct MPS2 to be shutdown in anticipation of the arrival of the hurricane. As a result, at the time of the ELAP event, the decay heat in the core would be significantly lower than a shutdown from power operations, therefore extending the time of CST depletion. **[Open Item 10]** Action Item 12: Repower 120 VAC vital buses – 19 hours Based on the Class 1E DC battery preliminary loading analysis discussed in Action Item 7 above, stripping non-essential AC and DC loads will extend the battery life to 19 hours]. Prior to battery depletion, backup power must be provided for continued availability of essential instrumentation and controls powered from the 120 VAC vital buses. Portable diesel generators (DGs) will be utilized to provide backup power to selected 120 VAC vital buses associated with essential instrumentation circuits. The portable 120 VAC DGs will be deployed from the protected storage location to the staging location and pre-made cables will be connected to pre-installed BDB electrical receptacles

	near the staging location to provide required backup power. As an alternate backup power supply, a 480 VAC DG can be deployed from the BDB Storage Building(s). A separate BDB electrical receptacle will be pre-installed, and pre-made cables will be available, to allow the 480 VAC DG to provide required power to Class 1E 480 VAC buses. When supplemental staff arrives after 6 hours, deployment of the 120 VAC or 480 VAC DGs is expected to begin. Assuming 2 hours for debris removal and an additional 2 hours for transport and connection of the DGs at the staging location, backup power is expected to be available within approximately 10 hours. Therefore, there is considerable margin to the required time constraint of 19 hours for this action. This margin is more than adequate to account for the delay due to receding flood waters around MPS2. See Section F1.2 for additional information related to repowering the 120 VAC vital buses. <u>Action Item 15:</u> Add inventory to SFP – 30 hours Evaluations estimate that with no operator action following a loss of SFP cooling, the SFP will reach 212°F in approximately 6 hours and boil off to a level 10 feet above the top of fuel in approximately 30 hours from initiation of the event (Reference Calculation MISC-11792). To provide makeup to the SFP, a fire hose will be connected to the discharge of the BDB High Capacity pump or fire truck located at the barge slip. This pump discharge hose will tie into a water thief located east of the Auxiliary Building roll up door. A water thief is a water distribution manifold used in the fire service to take an input from a large diameter hose, usually 5 inch or grater, and break it down into several smaller ones, each with independent control of water flow at the valve. The hose to fill the SFP will run from the water thief through door 211 in the south wall of the Auxiliary Building and routed to the BDB connection located in the SFP skimmer cage, which ties into the existing emergency makeup water line. Alternate flowpaths include routing the BDB High Capacity pump directly over the edge of the SFP, or supplying portable spray nozzles. The BDB High Capacity pump has adequate capacity to provide SFP makeup flowrate requirements simultaneously with the flowrate requirements for AFW

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	uses as described in Section B.2. Actions required within the Fuel Building to align the flowpath to the SFP can be accomplished prior to potential inaccessibility caused by pool water boiling, which is expected to be significantly later than the 6-hour calculated onset of boiling, based on the large volume of the Fuel Building and presence of significant heat sinks (large mass of concrete floors, walls, and ceiling, and fuel handling equipment). The BDB High Capacity pump (or fire truck) would have been deployed within 7.2 hours per Action Item 10 above. Routing the hose from the water thief to the connection in the SFP skimmer cage is a short duration task. Therefore, there is considerable margin to the required time constraint of 30 hours for this action. Refer to Section E for additional information related to providing makeup flow to the SFP. <u>Action Item 16:</u> Initiate RCS injection for inventory make-up / reactivity control using the BDB RCS Injection pump – 32 hours An analysis of the current MPS2 RCS design determined that following a reactor trip and a loss of AC power, with no RCS makeup the time of end of natural circulation flow and start of reflux cooling would be 32.4 hours. Therefore, RCS makeup is required by 32 hours. (Reference ETE-NAF-2012-0150). In response to an ELAP event, the portable BDB RCS Injection pump will be transported from a BDB storage building and positioned in the Protected Area (PA) outside the Turbine building truck bay. A high pressure hose will be routed from the pump discharge to a permanent hose connection, which provides a flow path to the RCS. A second hose will be routed from the pump suction to another permanent hose connection that provides a flow path from the refueling water storage tank (RWST). Deployment of the BDB RCS Injection pump will start approximately 22 hours after the event. By this time, the path from the BDB storage building(s) will have been cleared for deployment of other BDB equipment and sufficient time would have elapsed for any flood waters to recede. Allowing two hours to transport the pump from the BDB storage building and connect the suction and

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	discharge hoses, the pump could begin flow to the RCS within 24 hours. This is well before the 32.4-hour required time to ensure natural circulation is maintained. Action Item 17: Reduce pressure and temperature in Containment - > 7 days Conservative analysis concludes that containment temperature and pressure response will remain below design limits and that key parameter instrumentation subject to the containment environment will remain functional for at least seven days. Therefore, action to reduce containment pressure and temperature will not be required for a minimum of seven days following the ELAP event initiation. (Reference Calculation MISC-11793) Further analysis is required to determine the strategy and time requirements for actions beyond seven days to reduce containment pressure and temperature, if any. **[Open Item 14]** See Section D for additional information related to containment pressure and temperature following an ELAP/LUHS event.
A.5 - Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes.* To ensure that the FLEX strategies can be deployed in all modes, areas adjacent to the equipment storage and equipment deployment locations on both units will be administratively controlled to maintain access for BDB use. Sufficient margins will be included in hydraulic calculations to allow for hose routing around permanent plant equipment and temporary equipment staged in the PA during maintenance activities, to both the primary and alternate connection points for each strategy. **[Open Item 3]** Mode-specific impacts on FLEX strategies are described below. Mode 1 Power Operations - this is the limiting condition for FLEX strategies and provides the basic assumptions for sizing and selection of equipment (e.g., >100 days of full power operation).

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	Mode 2 Startup - operation in this mode occurs the least amount of time, with lower levels of decay heat than Mode 1. Mode 1 equipment design assumptions bound Mode 2 impacts on FLEX strategies. No additional or modified strategies are necessary for this mode. Mode 3 Hot Standby - operation in this mode occurs for relatively short periods with lower levels of decay heat than Mode 1. Mode 1 equipment design assumptions bound Mode 3 impacts on FLEX strategies. No additional or modified strategies are necessary for this mode. Mode 4 Hot Shutdown - operation in this mode occurs for relatively short periods with lower levels of decay heat than Mode 1. Mode 1 equipment design assumptions bound Mode 4 impacts on FLEX strategies. No additional or modified strategies are necessary for this mode. Mode 5 Cold Shutdown – operation in this mode occurs during relatively short periods. Dominion will have provisions as required in NEI 12-06 Appendix D as follows: 1. Primary and alternate RCS injection connections will be installed, as described in Section C.2, that can provide feed and spill cooling capabilities 2. The connections will be designed for, and hydraulic analyses will be performed to confirm, makeup rates to support core cooling requirements (Connection designed for 350 gpm) **[Open Item 3]** 3. The BDB Auxiliary Feedwater (AFW) Pumps and associated equipment will be maintained available for deployment with makeup from the RWST to the primary or alternate RCS injection connections; and 4. Procedures will direct usage of the equipment as applicable. Mode 6 Refueling - operation in this mode occurs during relatively short periods of time. As described for Cold Shutdown mode, the BDB AFW Pumps will be available to add water from the RWST to the RCS via the primary or alternate RCS injection connections.

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A.6 - 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)**
• **Staffing analysis completion**
• **BDB equipment acquisition timeline**
• **Training completion for the strategies**
• **Regional Response Centers (RRCs) operational**
 	
Ref: NEI 12-06 section 13.1
	The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.
	• Modifications timeline.
	  ○ Phase 1: The small number of modifications that are anticipated for Phase 1 are included in the timeline for Phase 2. Phase 1 modifications are described in the section to Maintain Core Cooling & Heat Removal (B.1).
	  ○ Phase 2: Modifications will occur per the milestone schedule in Attachment 2A.
	  ○ Phase 3: Modifications will occur on the milestone schedule in Attachment 2A.
	
	• Procedure guidance development for Strategies and Maintenance.
	  ○ Strategies: Shown on Attachment 2A as "Issue FSGs and Associated Procedure Revisions."
	  ○ Maintenance: Shown on Attachment 2A as "Create Maintenance Procedures"
	
	• Storage plan: Storage planning is included with the time segment identified as "Develop Mods" on Attachment 2A. Implementation is included with the time segment identified as "Implement Mods" on Attachment 2A.
	• Staffing Analysis: **[Open Item 1]**
	• FLEX equipment acquisition timeline: Shown on Attachment 2A as "Procure Equipment."
	• Training completion for the strategies: Shown on Attachment 2A as "Implement Training."
	• Regional Response Center (RRC) operational: Anticipated to occur by August 30, 2014.

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A.7 - Identify how the programmatic controls will be met. **Ref: NEI 12-06 section 11 JLD-ISG-2012-01 section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section.* *See section 6.0 of JLD-ISG-2012-01.* 1) Quality Attributes Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control as outlined in this section. If the equipment is credited for other functions (e.g., fire protection), then the quality attributes of the other functions apply. 2) Equipment Design Design requirements and supporting analysis will be developed for portable equipment that directly performs a FLEX mitigation strategy for core cooling, RCS inventory, containment function, and SFP cooling. The design requirements and supporting analysis provide the inputs, assumptions, and documented analysis that the mitigation strategy and support equipment will perform as intended. Manufacturer's information will be used in establishing the basis for the equipment use. The specified portable equipment capacities ensure that the strategy can be effective over a range of plant and environmental conditions. This design documentation will be auditable, consistent with generally accepted engineering principles and practices, and controlled within Dominion's document management system. The basis for design flow requirements considers the following: a) Pump design output performance (flow/pressure) characteristics. b) Line losses due to hose size, coupling size, hose length, and existing piping systems. c) Head losses due to elevation changes, especially for spray strategies. d) Back pressure when injecting into closed/pressurized spaces (e.g., RCS, containment, SGs). e) Capacity, temperature, boron concentration, water quality (suspended solids content, etc.) and

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	availability of the suction sources given the specific external initiating events (CST/RWST/fire main/Long Island Sound, etc.) to provide an adequate supply for the BDB pumps (fire engines, portable pumps, fire protection system pumps, etc.). f) Potential detrimental impact on water supply source or output pressure when using the same source or permanently installed pump(s) for makeup for multiple simultaneous strategies. g) Availability of sufficient supply of fuel on-site to operate diesel powered pumps and generators for the required period of time. h) Potential clogging of strainers, pumps, valves or hoses from debris or ice when using Long Island Sound as a water supply. i) Environmental conditions (e.g., extreme high and low temperature range) in which the equipment would be expected to operate. 3) Storage of Equipment A study is in progress to determine the design features, site location(s), and number of equipment storage facilities. The final design for BDB equipment storage will be based on the guidance contained in NEI 12-06, Section 11.3, Equipment Storage. A supplement to this submittal will be provided with the results of the equipment storage study. **[Open Item 4]** 4) Procedure Guidance **[Open Item 5]** a) FSGs will be developed in accordance with Pressurized Water Reactors Owners Group (PWROG) guidance. b) Interface with EOPs EOP 2530, "Station Blackout" will be revised to the extent necessary to implement FSGs. c) Interface with Abnormal Operating Procedures (AOPs) The AOPs listed below will be revised to the extent necessary to implement FSGs. AOP 2560, "Storms, Winds and High Tides" AOP 2562, "Earthquake" AOP 2578, "Loss of Refuel Pool and Spent Fuel Pool Level" d) FSG Maintenance Process FSG maintenance will be performed using the

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	administrative process for procedure control. e) Regulatory Screening/Evaluation NEI 96-07, Revision 1, and NEI 97-04, Revision 1 will be used to evaluate the changes to existing procedures as well as to the FSG to determine the need for prior NRC approval. Changes to procedures that perform actions in response events that exceed a site's design basis should, per the guidance and examples provided in NEI 96-07, Rev. 1, screen out. Therefore, procedure steps which recognize the BDB ELAP/LUHS has occurred and which direct actions to ensure core cooling, SFP cooling, or containment integrity should not require prior NRC approval. 5) Maintenance and Testing **[Open Item 6]** a) Periodic testing and preventative maintenance of BDB equipment will follow guidance provided in Institute of Nuclear Power Operations (INPO) AP-913. Testing and maintenance recommendations will be developed by Electric Power Research Institute (EPRI) and EPRI guidance documents will be used to develop testing frequencies and maintenance schedules. b) The unavailability of equipment and applicable connections that directly performs a FLEX mitigation strategy for core, containment, and SFP will be managed such that risk to mitigating strategy capability is minimized. Maintenance / risk guidance will be developed as follows: i) Portable BDB equipment may be unavailable for 90 days provided that the site FLEX capability (N) is available. ii) If portable equipment becomes unavailable such that the site FLEX capability (N) is not maintained, initiate actions within 24 hours to restore the site FLEX capability (N) and implement compensatory measures (e.g., use of alternate suitable equipment or supplemental personnel) within 72 hours. iii) Work Management procedures will be revised to reflect AOTs (Allowed Outage Times) as outlined above. 6) Training (See section A.8)

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	7) Staffing - A table top review of FLEX strategies and minimum on-site staffing will be performed to validate staffing needs. **[Open Item 1]** 8) Configuration Control **[Open Item 7]** a) The FLEX strategy and its basis will be maintained in an overall program document. The program document will address the key safety functions to: i) Provide reactor core cooling and heat removal, ii) Provide RCS inventory and reactivity control, iii) Ensure containment integrity, iv) Provide SFP cooling, v) Provide indication of key parameters, and vi) Provide reactor core cooling (Modes 5 and 6). b) In addition to the key safety functions listed above, support functions have been identified that provide support for the implementation of the FLEX strategies. Those support functions include: i) Providing load stripping of 125 VDC and 120 VAC vital buses to extend battery life, ii) Re-powering AC and DC electrical buses, iii) Providing ventilation for equipment cooling and area habitability, iv) Providing lighting, v) Providing communications capability, vi) Providing for fueling of portable equipment, and vii) Providing plant and area access. c) The program document will also contain a historical record of previous strategies and their bases. The program document will include the bases for ongoing maintenance and testing activities for the BDB equipment. d) Existing design control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies. Changes for the FLEX strategies will be reviewed with respect to operations critical documents to ensure no adverse effect. e) Future changes to the FLEX strategies may be made without prior NRC approval provided: i) The revised FLEX strategies meet the requirements of NEI 12-06. ii) An engineering basis is documented that ensures that the change in FLEX strategies continues to

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	ensure the key safety functions (core and spent fuel pool cooling, containment integrity) are met.
A.8 - Describe training plan	*List training plans for affected organizations or describe the plan for training development* Dominion's Nuclear Training Program will be revised to assure personnel proficiency in the mitigation of BDB events is developed and maintained. These programs and controls will be developed and implemented in accordance with the Systematic Approach to Training (SAT). **[Open Item 8]** Initial and periodic training will be provided to site emergency response leaders on BDB emergency response strategies and implementing guidelines. Personnel assigned to direct the execution of mitigation strategies for BDB events will receive necessary training to ensure familiarity with the associated tasks, considering available job aids, instructions, and mitigating strategy time constraints. Operator training for BDB event accident mitigation will not be given undue weight in comparison with other training requirements. The testing/evaluation of Operator knowledge and skills in this area will be similarly weighted. Operator training will include use of equipment from the RRC. "ANSI/ANS 3.5, Nuclear Power Plant Simulators for use in Operator Training" certification of simulator fidelity (if used) is considered to be sufficient for the initial stages of the BDB external event scenario until the current capability of the simulator model is exceeded. Full scope simulator models will not be upgraded to accommodate FLEX training or drills. Where appropriate, integrated FLEX drills will be organized on a team or crew basis and conducted periodically; with all time-sensitive actions to be evaluated over a period of not more than eight years. It is not required to connect/operate permanently installed equipment during these drills.

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A.9 - Describe Regional Response Center plan	The industry will establish two (2) Regional Response Centers (RRC) to support utilities during BDB events. Dominion has established contracts with the Pooled Equipment Inventory Company (PEICo) to participate in the process for support of the RRCs as required. Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. In addition, on-site BDB equipment hose and cable end fittings are standardized with the equipment supplied from the RRC. Equipment will be moved from an RRC to a local Assembly Area, established by the Strategic Alliance for FLEX Emergency Response (SAFER) team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

Dominion Nuclear Engineering ETE-CEE-2012-1001, "Millstone Beyond Design Basis DC Load Shedding Strategy and Analysis for Extended SBO Event," March 27, 2012

Dominion Nuclear Engineering ETE-NAF-2012-0150, "Evaluation of Core Cooling Coping for Extended Loss of AC Power (ELAP) and Proposed Input for Dominion's Response to NRC Order EA-12-049 for Dominion Fleet," Revision 1, January 10, 2013.

Dominion Nuclear Engineering Calculation MISC-11792, "Extended Loss of AC Power, Spent fuel Pool Heatup times and Water Makeup for Dominion Nuclear," Revision 0, February 8, 2013.

Dominion Nuclear Engineering Calculation MISC-11793, "Evaluation of Long Term Containment Pressure and Temperature Profiles Following Loss of Extended AC Power (ELAP)," Revision 0, February 8, 2013.

MPS2 FSAR, Revision 30.

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B. Maintain Core Cooling & Heat Removal

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

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

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

B.1 - PWR Installed Equipment Phase 1

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

Following the occurrence of an ELAP/LUHS event, the reactor will trip and the plant will initially stabilize at slightly higher than no-load RCS temperature and pressure conditions, with reactor decay heat removal via steam release to the atmosphere through the SG safety valves and/or atmospheric dump valves (MS ADVs). Natural circulation of the RCS will develop to provide core cooling and the steam turbine driven auxiliary feedwater (TDAFW) pump will be started to provide flow from the CST to the SGs to make-up for steam release.

Operators will respond to the event in accordance with EOPs to confirm RCS, secondary system, and containment conditions. A transition to EOP 2530, Station Blackout, will be made upon the diagnosis of the total loss of AC power. This procedure directs isolation of RCS letdown pathways, confirmation of natural circulation cooling, verification of containment isolation, reducing DC loads on the unit's batteries, and establishment of electrical equipment alignment in preparation for eventual power restoration. The operators will start the TDAFW pump, control AFW flow to the SGs, establish local manual control of the MS ADVs, and stabilize the RCS at no-load cold leg temperature.

The PWROG is currently evaluating establishing criteria and guidance for a rapid cooldown and depressurization of the RCS in response to an ELAP/LUHS that would be applicable to Combustion Engineering designs such as MPS2. The MPS2 evaluation for ELAP/LUHS response described herein is based on initiation of a rapid cooldown of the RCS, by releasing steam from the SGs to a minimum steam pressure of 120 psig, upon diagnosis of the event, then stabilizing the plant at those conditions. Consistency with the PWROG evaluation will be confirmed when the results are available. **[Open Item 9]**

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

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Core Cooling and Heat Removal Phase 1 Strategy

The Phase 1 strategy for reactor core cooling and heat removal relies upon installed plant equipment and water sources for AFW supply to the SGs and steam release to the atmosphere.

The TDAFW pump will be remotely started from the main control room (MCR) in accordance with SBO response procedures and does not require AC or DC electrical power to provide AFW to the SGs. If the TDAFW pump fails to start or trips, operators can restart the pump locally. Sufficient time (approximately 50 minutes) will be available to restart the pump prior to SG dry-out conditions. The AFW system is pre-aligned for flow to both SGs from the TDAFW pump. Manual control of AFW flowrate to the SGs will be required within approximately 2.6 hours to prevent overfill.

Steam release from the SGs will be controlled by local manual operation of the MS ADVs using the installed manual control handwheel. RCS cooldown will be initiated by releasing steam from the SG to a minimum SG pressure of 120 psig. The RCS cooldown minimizes adverse effects of high temperature/pressure coolant on RCP shaft seal performance and reduces SG pressure to allow for eventual feedwater injection from a portable pump in the event that the TDAFW pump is not available. The minimum SG pressure will be established to prevent safety injection tank nitrogen gas from entering the RCS.

Initially, AFW water supply will be provided by the installed CST. The tank has a minimum usable capacity of 142,746 gallons and will provide a suction source to the TDAFW pump for approximately 7.2 hours of RCS decay heat removal assuming a concurrent RCS cooldown to a minimum SG pressure of 120 psig.

Vital AC and DC bus load stripping will be implemented to preserve battery life as described in Section F1.1. Selected vital AC circuits remain energized following load stripping to provide power to necessary instrumentation, in order to provide the key reactor parameter information, as indicated in Section B.1.3.

The equipment relied upon to provide reactor core cooling and heat removal for the Phase 1 strategy, with the exception of the MS ADVs and the TDAFW pump, are protected against the applicable external hazards described in Section A.1.

The TDAFW pump is located at Elevation 14 feet 6 inches in the Turbine Building. As described in Section A.1, the extreme flooding event caused by storm surge and wave run-up from a hurricane has the potential to flood the lower elevations of the Turbine Building, which could disable the TDAFW pump. In the unlikely event of this extreme flood condition, the pre-staged BDB AFW Pump (described in Section B.2) would be used to provide AFW to the SGs.
[Open Item 10]

In addition, the TDAFW pump turbine exhaust lines are not tornado missile protected above Elev. 72 feet 0 inches. The exhaust lines will be modified to provide a tornado missile protected steam

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exhaust path such that the TDAFW will be available following a tornado / high wind event.
[Open Item 11]

The TDAFW Pump Room is a seismic category I, turbine missile protected area that is not affected by extreme low or high temperature outdoor conditions. Therefore, with the completion of the modification to the steam exhaust lines described above, the TDAFW pump is protected from the effects of the events described in Section A.1 except for the extreme flood event.

The outlet vent piping for the MS ADVs is not seismically designed or designed to be protected from tornado generated missiles. A preliminary engineering evaluation concludes that these lines will meet performance requirements following a seismic event or tornado. The final evaluation will be completed prior to the required implementation date for the FLEX Program.
[Open Item 12]

Details:	
B.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* The PWROG is currently evaluating establishing criteria and guidance for a rapid cooldown and depressurization of the RCS in response to an ELAP/LUHS for Combustion Engineering designs such as MPS2. The revised emergency procedure for the response to SBO will provide the necessary guidance to accomplish the Phase 1 strategy for core cooling and heat removal. **[Open Item 9]**
B.1.2 - Identify modifications	*List modifications and describe how they support coping time.* A modification will be performed to provide tornado missile protection for the TDAFW pump turbine steam exhaust lines. **[Open Item 11]** This modification will ensure availability of the TDAFW pump following a tornado / high wind event to support the strategy to provide AFW flow to the SGs.
B.1.3 - Key Reactor Parameters	*List instrumentation credited for this coping evaluation phase.* Instrumentation providing the following key parameters is credited for Phase 1: AFW Flowrate: Indication of AFW flowrate to each SG is available in the MCR and on the fire shutdown panel (C-10). AFW flowrate indication for all SGs is available throughout the event. SG Water Level: SG wide range (WR) and narrow range (NR) water level indication is available for both SGs from the MCR and C-10 throughout the event.

	SG Pressure: SG pressure indication is available for both SGs from the MCR and C-10 throughout the event. CST Level: CST water level indication is available from the MCR and locally at the tank throughout the event. RCS Temperature: RCS hot-leg and cold-leg temperature indication is available from the MCR and C-10 throughout the event. RCS Temperature: Core exit thermocouple indication is available from ICC Cabinet B throughout the event.

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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B. Maintain Core Cooling & Heat Removal

B.2 - PWR Portable Equipment Phase 2

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

As described in Section B.1, Phase 1 coping following an ELAP/LUHS will be accomplished using the installed TDAFW pump to feed the SGs, MS ADVs for SG steam release to control RCS temperature and effect an RCS cooldown, and the CST to provide the AFW water source to the TDAFW pump. The Phase 1 coping strategy provides reactor core cooling and decay heat removal for a minimum of 7.2 hours and is sufficient to stabilize the plant at 120 psig SG pressure, which will result in RCS cold leg temperature of approximately 350 deg F with pressure greater than safety injection tank nitrogen injection pressure.

Core Cooling and Heat Removal Phase 2 Strategy

The Phase 2 strategy for reactor core cooling and heat removal provides indefinite supply of water for feeding SGs and a diesel driven backup AFW pump for use in the event that the TDAFW pump becomes unavailable. Initial evaluations indicate that the TDAFW pump will operate long-term until reactor decay heat is reduced to a point where adequate SG steam pressure cannot be provided **[Open Item 13]**. The strategy includes repowering of vital 120 VAC buses to maintain availability of key parameters monitoring instrumentation. Phase 2 electrical bus repowering is described in Section F.1.2.

a. Indefinite Supply of Water for SG Injection
MPS has multiple fresh water supplies which will be deployed to add water to the CST or provide a suction directly to the BDB AFW pump. These include the 3,000,000 gallon site pond which can provide core cooling supply for greater than 20 days to each unit (Reference Calculation MISC-11787 **[Open Item 2]**). The Long Island Sound will only be used as a last resort.

An indefinite supply of water make-up to the CST can be provided from the Long Island Sound, which will remain available for any of the external hazards listed in Section A.1. Refer to Figure 2 for a diagram of the flowpath and equipment utilized to facilitate this water supply. The diesel driven BDB High Capacity Pump (Table 1) will be transported from the BDB Storage Building(s) to a location near the water source. Alternatively, if available, the station fire truck can be utilized in place of the BDB High Capacity Pump. A flexible hose will be routed from the pump suction to the water source where water will be drawn through a strainer sized to limit solid debris size to prevent damage to the TDAFW or the BDB AFW pump. A flexible hose will be routed from the BDB High Capacity Pump discharge to the CST refill BDB connection via a distribution manifold that also provides water to the SFP as described in Section E.2 and the RCS as described in Section C.2. The BDB High Capacity Pump will be sized to provide 300 gpm AFW water supply, 250 gpm make-up to the SFP, and 45 gpm RCS supply each to both MPS2 and 3 simultaneously.

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B. Maintain Core Cooling & Heat Removal

B.2 - PWR Portable Equipment Phase 2

As indicated in the sequence of events discussed in Section A.4, the back-up supply of SG injection water will be made available prior to the loss of suction source to the TDAFW pump, which occurs after approximately 7.2 hours after the ELAP/LUHS initiation. Hydraulic analysis of the flowpath from the Long Island Sound to the CST will be performed to confirm that applicable performance requirements are met. **[Open Item 3]**

b. Back-up SG Water Injection

Consistent with NEI 12-06, Appendix D, backup SG water injection capability will be provided using a portable AFW pump through a primary and alternate connection. The diesel-driven BDB AFW Pump (Table 1) will provide a back-up SG injection method in the event that the TDAFW pump can no longer perform its function. Hydraulic analyses will be performed to confirm that the BDB AFW pump is sized to provide the minimum required SG injection flowrate to support reactor core cooling and decay heat removal. **[Open Item 3]**

For the case of the extreme flood that could disable the TDAFW pump, a BDB AFW Pump will be pre-staged at elevation 31 feet 6 inches of the Turbine Building (above floodwater level). This location is within a seismic category I structure, but is not tornado missile protected. As described in Section A.1, the extreme flood that potentially results in flood waters entering the lower levels of the Turbine Building and threatens availability of the TDAFW pump is the result of a hurricane. Plant procedures provide guidance to shutdown the unit prior to severe hurricane conditions on site, which allows the RCS to be cooled down to conditions which would allow flow to the SGs from the pre-staged BDB AFW pump. In the event that hurricane storm surge and wave run up are higher than flood barriers is predicted, which could result in flooding in the turbine building, procedures will direct the establishment of the flowpath from the pre-staged BDB AFW Pump to the SGs prior to Turbine Building flooding. The pre-staged BDB AFW Pump would be used to provide flow in the event of failure of the TDAFW pump due to flooding. **[Open Item 10]**

For BDB events other than the extreme flood, the BDB AFW Pump will be transported from a BDB Storage Building(s) to a location near the system connection established for discharge to the SG (described below). A flexible hose will be routed from the BDB AFW Pump suction connection to the pump suction (Figure 3). The BDB AFW Pump discharge can be aligned to either a primary or alternate SG injection connection.

b.i Primary SG Injection Connection

The primary SG injection connection will be located on the AFW pump discharge header in the AFW Valve Cage area of the Turbine Building at Elevation 14 feet 6 inches. A flexible hose will be routed from the BDB AFW Pump discharge to the primary SG injection connection through the Turbine Building (Figure 3). The AFW Valve Cage area of the Turbine Building is seismic category I and is protected from high winds and associated missiles. The primary SG injection

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B. Maintain Core Cooling & Heat Removal	
B.2 - PWR Portable Equipment Phase 2	
connection will be available for all hazards listed in Section A.1. Hydraulic analysis of the flowpath from the BDB AFW Pump suction connection to the primary SG injection connection will be performed to confirm that applicable performance requirements are met. **[Open Item 3]** b.ii Alternate SG Injection Connection In the event that the primary SG injection connection is not available, an alternate SG injection connection will be provided. The alternate SG injection connection will be located in the main feedwater system at the 54 feet 6 inch elevation of the Turbine Building in a separate area from the AFW Valve Cage. The alternate SG injection connection consists of a hose adapter that replaces the valve bonnet on each of the two SG feedwater regulating valve bypass valves (Figure 3). A flexible hose will be routed from the BDB AFW Pump discharge to the alternate SG injection connection hose adapter. This alternate SG injection connection approach relies upon the non-seismic category I, non-tornado missile protected area of the Turbine Building. Therefore, the availability of this connection is not assured following a seismic event or tornado. However, the alternate SG injection connection will be protected against the other hazards listed in Section A.1. Hydraulic analysis of the flowpath from the BDB AFW Pump suction connection to the alternate SG injection connection will be performed to confirm that applicable performance requirements are met. **[Open Item 3]**	
Details:	
B.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing the core cooling and heat removal strategies will be developed using industry guidance, and will address the necessary steps to deploy portable pumps and hoses, establish connections, and operate the portable equipment to perform the required function. **[Open Item 5]**
B.2.2 - Identify modifications	*List modifications necessary for Phase 2* (1) Install the BDB AFW Pump suction connection located on the suction line to the TDAFW pump. **[Open Item 11]** (2) Install the BDB CST Refill connection **[Open Item 11]** (3) Install BDB AFW primary SG injection connection located on the AFW pump discharge header in the AFW Valve Cage. **[Open Item 11]**

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B. **Maintain Core Cooling & Heat Removal**	
B.2 - PWR Portable Equipment Phase 2	
B.2.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 2 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section B.1.3 for Phase 1. Portable BDB equipment will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.
B.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

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B. **Maintain Core Cooling & Heat Removal**	
B.2 - PWR Portable Equipment Phase 2	
High Temperatures	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

B.2.5 - Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use. a. Indefinite Supply of Water for SG Injection The BDB High Capacity Pump or station fire truck will be deployed to transfer water from Long Island Sound to fill the CST. Figure 1, sheets A and B, identify the deployed location of BDB equipment and routing of hoses, relative to plant structures and other features, necessary to implement this strategy. The BDB High Capacity Pump will be a trailer-mounted, diesel driven centrifugal pump that will be stored in the BDB Storage Building(s). The pump will be deployed by towing the trailer to a designated location near the barge slip, which is adjacent to Long Island Sound shoreline. One end of a length of flexible hose, equipped with	*Identify modifications* CST Refill BDB connection - modification required to permanently install this connection **[Open Item 11]** The CST refill BDB connection consists of a piping tee fitting installed in the CST supply line to the motor driven AFW pumps. The connection will be located in the AFW Valve Cage area of the Turbine Building. The connection will be a hose quick-connect fitting and includes an isolation valve.	*Identify how the connection is protected* The CST refill BDB connection will be located within the Turbine Building in an area that is seismic category I and protected from high winds and associated missiles. Therefore the connection will be protected from the external hazards described in Section A.1.

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B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
a strainer, will be lowered to below the water surface, and the other end will be attached to the pump suction via quick-connect hose connection. A flexible hose will be routed from the pump discharge quick-connect hose fitting to a distribution manifold. From this manifold, a hose will be routed to the CST refill BDB connection (modification required to permanently install this connection). The pump discharge hose will be routed along the ground and access to the CST refill BDB connection is through the Turbine Building. As indicated in the sequence of events discussed in Section A.4, the back-up supply of SG injection water will be made available prior to the loss of suction source to the TDAFW pump, which occurs approximately 7.2 hours after the ELAP/LUHS initiation.		
<u>b. Back-up SG Water Injection</u> The pre-staged BDB AFW Pump will be located at Elev. 31 feet 6 inch of the Turbine Building (above floodwater level). Upon indication of the potential for an extreme site flooding condition due to hurricane induced tidal surge and wave action that could affect the TDAFW pump	b. BDB AFW Pump Suction Connection – modification required to permanently install this connection. **[Open Item 11]** The BDB AFW Pump suction connection consists of a piping tee fitting installed in the CST supply line to the TDAFW pump. The connection will be	b. The BDB AFW Pump Suction connection will be located within the Turbine Building in an area that is seismic category I and protected from high winds and associated missiles. The connection will be protected from the external hazards described in Section A.1.

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B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
availability, flexible hoses will be deployed to connect the pre-staged BDB AFW pump suction and discharge to the BDB suction and primary discharge connections. **[Open Item 10]** Under conditions other than the extreme flooding event, the stored BDB AFW Pump will be deployed to provide an alternate source of high pressure SG injection capability in the event that the TDAFW pump cannot perform its function due to low SG pressures. Figure 1, sheets A and B, identifies the deployed location of BDB equipment and routing of hoses, relative to plant structures and other features, necessary to implement this strategy. The BDB AFW Pump will be a trailer-mounted, diesel driven centrifugal pump that will be stored in the BDB Storage Building(s). The pump will be deployed by towing the trailer to a designated location near the Turbine Building. An appropriate length of flexible hose equipped with quick-connect hose fittings will be routed between the BDB AFW Pump suction connection (modification required to permanently install this	located in the AFW Valve Cage area of the Turbine Building. The connection will be a hose quick-connect fitting and includes an isolation valve. b.i Primary SG injection connection - modification required to permanently install this connection. **[Open Item 11]** The primary SG injection connection consists of a piping tee fitting installed in the AFW pump discharge header located in the AFW Valve Cage area of the Turbine Building. The connection will be a quick-connect hose fitting and includes an isolation valve and a vent.	b.i The primary SG injection connection will be located within the Turbine Building in the AFW Valve Cage area that is seismic category I and protected from high winds and associated missiles. The connection will be protected from the external hazards described in Section A.1. b.ii The alternate SG injection connection will be located within the non-seismic category I, non-missile protected portion of the Turbine Building. As such, this connection point may not be available following a seismic event or high wind condition. The connection will be protected from the other external hazards described in Section A.1.

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B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
connection) and the pump suction (Figure 3). Hose routing will be along the ground and through the Turbine Building. For discharge to the primary SG injection connection described in Section B.2.b.i, a suitable length of high pressure flexible hose will be routed from the BDB AFW Pump to the primary SG injection connection in the AFW Valve Cage area of the Turbine Building. The hose will be attached to the BDB AFW Pump discharge nozzle via quick-connect hose fitting. The other end of the hose will be attached to the hose quick-connect fitting at the primary SG injection connection (modification required to permanently install this connection). Water from the CST can be pumped to the SGs via the primary SG injection connection through the AFW system piping. For discharge to the alternate SG injection connection described in Section B.2.b.ii, a suitable length of high pressure flexible hose will be routed from the BDB AFW Pump through the Turbine Building to		

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B. **Maintain Core Cooling & Heat Removal**		
B.2 - PWR Portable Equipment Phase 2		
the feedwater regulating valve area at Elevation 54 feet 6 inches. The hose will be connected to the main feedwater line by disassembling the main feedwater regulator valve bypass valves to remove the valve bonnet and install a pre-fabricated flanged hose adapter assembly. Water from the CST can be pumped to the SGs via the main feedwater system piping as described in Section B.2.b.ii.		

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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B. Maintain Core Cooling & Heat Removal	
B.3 - PWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods and strategy(ies) utilized to achieve this coping time. Additional pumps will be provided from the RRC to provide backup to the BDB AFW pumps as well as the BDB High Capacity pumps. The installed TDAFW pump has the capability to operate for an extended period of time. Failure of the TDAFW pump can be mitigated by the on-site BDB AFW pump. The RRC pumps provide backup capability should multiple failures occur during extended operation after several days or weeks from the event.	
Details:	
B.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* See Section B.2.1.
B.3.2 - Identify modifications	*List modifications necessary for Phase 3* None
B.3.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 3 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section B.1.3 for Phase 1. Portable BDB equipment from the RRC will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

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B. Maintain Core Cooling & Heat Removal		
B.3 - PWR Portable Equipment Phase 3		
B.3.4 - Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Phase 3 equipment will be provided by the RRC. Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored at the designated lay down area until moved to the point of use area. Pre-determined deployment paths will be used to move equipment as necessary.	*Identify modifications* No modifications have been identified to support Phase 3 deployment activities.	*Identify how the connection is protected* See Section B.2.5.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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C. 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**

C.1 - PWR Installed Equipment Phase 1:

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

With an ELAP/LUHS, the plant staff will implement a strategy for maintaining RCS inventory during plant stabilization and subsequent RCS cooldown activities. RCS inventory is preserved by isolating or verifying isolated potential RCS letdown paths. (RCS letdown isolation valves, controlled bleed-off, and RCS Sample valves)

In general, the FLEX strategy for RCS inventory control / reactivity management relies on RCP seal leakage being sufficiently low that no makeup to the RCS is required for the first 32 hours of an ELAP / LUHS event.

MPS2 RCPs currently have FlowServe N-9000 RCP seals installed. An analysis of RCS leakage with these seals installed and no RCS makeup indicated that natural circulation flow would end at 32.4 hours. Therefore, RCS makeup is required by 32 hours.

Reactivity analyses were performed which indicated that no boration is required to maintain k-effective less than 0.99 while cooling down and depressurizing to the target SG pressure of 120 psig, which corresponds to an RCS core inlet temperature of approximately 350 deg F. During the entire core cycle life, no increase in RCS boron concentration is required to maintain the k-effective less than 0.99 for RCS core inlet temperatures as low as 315 deg F.

Therefore, the Phase 1 FLEX strategy for RCS inventory control / reactivity management for the first 32 hours after the initiation of the ELAP / LUHS event is to rely on the low leakage seals to maintain adequate RCS water inventory. Then, within 32 hours after event initiation, have the necessary portable injection pump and hoses staged for long term RCS makeup and core reactivity management.

[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.

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C. Maintain RCS Inventory Control	
Details:	
C.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* RCS inventory is preserved by isolating or verifying isolated potential RCS letdown paths (RCS letdown isolation valves and RCS sample valves). Current procedures verify isolation of potential letdown paths and no revisions to these procedures are anticipated to accomplish the Phase 1 strategy for RCS Inventory Control.
C.1.2 -Identify modifications	*List modifications* No modifications are required for the Phase 1 strategy.
C.1.3 - Key Reactor Parameters	*List instrumentation credited for this coping evaluation.* SG Pressure: SG pressure indication is available from the MCR and the fire shutdown panel (C-10). SG pressure indication is available throughout the event. RCS Hot Leg Temperature: RCS hot-leg temperature indication is available from the MCR and C-10. Hot leg temperature indication is available throughout the event. RCS Cold Leg Temperature: RCS cold-leg temperature indication is available from the MCR and C-10. Cold leg temperature indication is available throughout the event. Pressurizer Level: Pressurizer level indication is available from the MCR and C-10. Pressurizer level indication is available throughout the event. Reactor Vessel Level Monitoring System (RVLMS): RVLMS indication is available from the MCR and the ICC cabinet. RVLMS is available throughout the event. Excore Nuclear Instruments: Indication of nuclear activity is available from the MCR. Indication is available throughout the event.

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Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

WCAP-17601, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs," August 2012.

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C. Maintain RCS Inventory Control

C.2 - PWR Portable Equipment Phase 2:

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

In order to ensure RCS inventory and reactivity controls are maintained, a portable, diesel powered, BDB RCS injection pump will be available to add borated water from the RWST to the RCS. The pump will be capable of providing a flow rate of 40 gpm with high pressure (greater than nominal operating pressure) discharge capability. This will ensure adequate shutdown margin is maintained and RCS inventory can be restored to the pressurizer.

The portable BDB RCS Injection pump will be transported from a BDB Storage Building and positioned in the PA outside the Turbine building truck bay (See Figure 1). A high pressure hose will be routed from the pump discharge to a permanent hose connection, which provides a flow path to the RCS. A second hose will be routed from the pump suction to another permanent hose connection that provides a flow path from the RWST. Deployment of the BDB RCS Injection pump will start approximately 22 hours after the event. By this time, the path from the BDB Storage Building(s) will have been cleared for deployment of other BDB equipment. Allowing 2 hours to transport the pump from the BDB Storage Building(s) and connect the suction and discharge hoses, the pump could begin flow to the RCS within 24 hours. This is well before the 32-hour required time identified in Section C.1 to ensure natural circulation is maintained.

<u>Primary water supply – RWST</u>
The primary supply of borated water for injection will be from the RWST. The BDB RCS pump suction supply connection will be located in the RWST valve pit in the RWST pipe chase. A temporary hose will be run from the BDB RCS injection pump suction to this connection. (See Figure 4) The RWST is stainless steel, safety related, seismically qualified, but is not missile protected. It has a usable volume of 370,000 gal of borated water at a concentration greater than 1720 ppm. The RWST is the preferred borated water source.

<u>Alternate water supply – Batching Tank</u>
In the event the RWST is damaged or should become unavailable, water from a 1000 gallon portable boric acid mixing tank will provide borated water for RCS make-up. This mixing tank would be transported from the on-site BDB Storage Building and positioned near the BDB RCS injection pump. The tank would be filled with water, and powdered boric acid would be added and mixed to the proper boric acid concentration needed to maintain adequate shutdown margin and RCS inventory. Bags of powdered boric acid are easy to deploy to any area of the plant where the batching tanks are required. Water for mixing would be supplied by the BDB High Capacity pump.

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C. Maintain RCS Inventory Control

C.2 - PWR Portable Equipment Phase 2:

Primary RCS injection path
Discharge from the BDB RCS injection pump will be into a high pressure hose which will be routed to the primary RCS injection connection located in the Turbine Building AFW valve cage. A hose connection will be connected to a 3-inch safety injection line by permanently installed stainless steel piping which will be installed as an extension of the high pressure hose connection. (See Figure 4)

The alternate RCS injection connection will use the discharge crosstie valve between the "A" charging pump and the "B" and "C" Charging Pumps, 2-CH-338. (Figure 5)

Hydraulic analysis of the flowpath from the BDB RCS injection pump suction connections to the primary and alternate RCS injection connections will be performed to confirm that applicable performance requirements are met. **[Open Item 3]**

Boration Requirements
For the limiting core burnup conditions, which occur at end of life (EOL), no additional boration is required for a cooldown and depressurization to a target SG pressure of 120 psig. This corresponds to a core inlet temperature of approximately 350 deg F. Cooldown could continue to a core inlet temperature of approximately 315 deg F with no boration and K_{eff} would remain less than 0.99. Calculations show that injection of 2100 gallons with a concentration of 1720 ppm boron will be adequate to meet the shutdown reactivity requirements for cooldown to 200 deg F.

Venting of RCS
Based on the potential for the formation of reactor head voiding during RCS natural circulation cooling following an ELAP, an evaluation of the need to establish an RCS vent path in order to successfully implement the RCS inventory and reactivity control strategy was performed. The evaluation considered the anticipated void formation and size, the low leakage expected from the RCS, and the volume of borated water injection necessary for adequate shutdown margin. Based on the small volume of water to be injected, and the high pressure capability of the BDB RCS injection pump, RCS venting is not anticipated to be required. In the event that RCS venting becomes necessary or desirable, the remotely-operated reactor head vent valves have been evaluated and determined to provide adequate venting capability to reduce head voiding and allow RCS injection.

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C. Maintain RCS Inventory Control	
C.2 - PWR Portable Equipment Phase 2:	
Details:	
C.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Site specific procedural guidance governing the core cooling and heat removal strategies will be developed using industry guidance, and will address the necessary steps to deploy portable pumps and hoses, establish connections, and operate the portable equipment to perform the required function. **[Open Item 5]**
C.2.2 - Identify modifications	*List modifications* 1) Install the BDB RCS injection pump suction connection in the RWST valve pit. **[Open Item 11]** 2) Install the primary RCS injection connection to the safety injection piping in the Turbine Building AFW valve cage. **[Open Item 11]**
C.2.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 2 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section C.1.3 for Phase 1. Additionally, RCS Wide Range Pressure is used during Phase 2. RCS Wide Range Pressure: RCS Wide Range Pressure indication is available from the MCR and C-10 throughout the event. Portable BDB equipment will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

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C. Maintain RCS Inventory Control	
C.2 - PWR Portable Equipment Phase 2:	
C.2.4 - Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon
High Temperatures	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from high temperature events while stored in the Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

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C. Maintain RCS Inventory Control		
C.2 - PWR Portable Equipment Phase 2:		
C.2.5 - Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The BDB RCS injection pump will be transported from a BDB Storage building and located outside the Turbine Building truck bay. A high pressure hose will be run from the discharge of the pump to the hose connection located in the AFW valve cage. A permanent pipe from this connection will tee into a 3-inch safety injection line to provide an injection path into the RCS.	*Identify modifications* A tee connection will be made into a 3-inch safety injection line at Elevation -5 feet in the Auxiliary Building. A stainless steel pipe will run from this line to makeup hose connection in the AFW valve cage in the Turbine Building. This line will include two safety related manual isolation valves and a non-safety related check valve. (See Figure 4)	*Identify how the connection is protected* The RCS makeup piping in the Auxiliary Building will be safety related (through the 2nd manual isolation valve), seismically designed and located in an area that provides high wind and associated missile protection. The hose connection will be in the Turbine Building which is seismically designed, and is located on the shared wall between the Aux and Turbine Buildings which affords adequate wind and missile protection.
b. Initial supply for the BDB RCS injection pump will be from a hose connection in the RWST valve pit in the RWST pipe chase providing RWST water for RCS makeup. A temporary hose will be used between the hose connection and the BDB RCS Injection pump.	A hose connection will be installed in the RWST valve pit in the RWST pipe chase to provide RWST water for RCS makeup. (See Figure 4)	The RCS makeup supply piping and connection in the RWST pipe chase will be safety related (through the 2nd manual isolation valve), seismically designed and located in an area that provides high wind and associated missile protection.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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C. Maintain RCS Inventory Control	
C.3 - PWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain RCS inventory. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time. Additional pumps, if needed, will be provided from the RRC to provide backup to the BDB RCS Injection pumps or other equipment that may be needed The RRC pumps provide backup capability should multiple failures occur during extended operation after several days or weeks from the event.	
Details:	
C.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* See Section C.2.1.
C.3.2 - Identify modifications	*List modifications* No modifications required for Phase 3.
C.3.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 3 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section C.1.3 for Phase 1. Portable BDB equipment from the RRC will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP

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C. Maintain RCS Inventory Control		
C.2 - PWR Portable Equipment Phase 2:		
C.3.4 - Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.*	*Identify modifications*	*Identify how the connection is protected*
Phase 3 equipment, if needed, will be provided by the RRC. Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored at the designated lay down area until moved to the point of use area. Pre-determined deployment paths will be used to move equipment as necessary.	No modifications have been identified to support Phase 3 deployment activities.	See C.2.5
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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D. 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)

D.1 - PWR Installed Equipment Phase 1:

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

The Phase 1 coping strategy for containment involves verifying containment isolation per EOP-2530, Station Blackout, and continuing to monitoring containment pressure using installed instrumentation.

Evaluations have been performed and conclude that containment temperature and pressure will remain below design limits and key parameter instruments subject to containment environment will remain functional for at least 7 days. Therefore, actions to reduce containment temperature and pressure and ensure continued functionality of the key parameters will not be required prior to this time and will utilize off-site equipment and resources during Phase 3.

Details:

D.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Procedural guidance for monitoring containment pressure is provided by EOP-2530, Station Blackout.
D.1.2 - Identify modifications	*List modifications* No plant modifications are required to support implementation of this Phase 1 strategy.
D.1.3 - Key Containment Parameters	*List instrumentation credited for this coping evaluation.* Containment Pressure - Containment pressure indication is available in the MCR throughout the event. Containment Temperature - Containment temperature indication is available in the MCR throughout the event.

[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.

Italicized text is part of the NEI standard template and is retained for information purposes.

D. Maintain Containment

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

Dominion Nuclear Engineering Calculation MISC-11793, "Evaluation of Long Term Containment Pressure and Temperature Profiles Following Loss of Extended AC Power (ELAP)."

Italicized text is part of the NEI standard template and is retained for information purposes.

D. Maintain Containment

D.2 - PWR Portable Equipment Phase 2:

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

Evaluations have been performed and conclude that containment temperature and pressure will remain below design limits and key parameter instruments subject to containment environment will remain functional for at least 7 days. Therefore, actions to reduce containment temperature and pressure and ensure continued functionality of the key parameters will not be required prior to this time and will utilize off-site equipment and resources during Phase 3. There is no separate Phase 2 strategy.

Details:

D.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* None required for Phase 2
D.2.2 - Identify modifications	*List modifications* None required for Phase 2
D.2.3 - Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Although a Phase 2 strategy is not required to maintain containment, the Phase 1 containment monitoring instrumentation will continue to be powered during Phase 2 from portable generators.

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D. Maintain Containment

D.2.4 - Storage / Protection of Equipment:
Describe storage / protection plan or schedule to determine storage requirements

Seismic	*List how equipment is protected or schedule to protect* None required for Phase 2.
Flooding	*List how equipment is protected or schedule to protect* None required for Phase 2.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* None required for Phase 2.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* None required for Phase 2.
High Temperatures	*List how equipment is protected or schedule to protect* None required for Phase 2.

D.2.5 - Deployment Conceptual Modification
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* None required for Phase 2.	*Identify modifications* None required for Phase 2.	*Identify how the connection is protected* None required for Phase 2.

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, “Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document,” Revision 0.

Dominion Nuclear Engineering Calculation MISC-11793, "Evaluation of Long Term Containment Pressure and Temperature Profiles Following Loss of Extended AC Power (ELAP)."

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D. Maintain Containment

D.3 - PWR Portable Equipment Phase 3:

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

Further analysis is required to determine the strategy and time requirements for actions beyond seven days to reduce containment pressure and temperature, if any. As such, the Phase 3 coping strategy to maintain containment integrity is under development. Methods to monitor and evaluate containment conditions and depressurize/cool containment, if necessary, will be provided in a future update. **[Open Item 14]**

Details:

D.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Phase 3 procedure guidance to evaluate containment conditions and depressurize/cool containment will be developed later.
D.3.2 - Identify modifications	*List modifications* To be determined.
D.3.3 - Key Containment Parameters	*List instrumentation credited for this coping evaluation.* Containment Pressure: Containment pressure indication is available in the MCR throughout the event. Containment Temperature: Containment temperature indication is available in the MCR throughout the event.

D.3.4 - Deployment Conceptual Modification
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Phase 3 strategies to assess containment conditions and deploy equipment to depressurize/cool containment will be developed later.	*Identify modifications* Any modifications for future Phase 3 strategies to assess containment conditions and deploy equipment to depressurize/cool containment will be developed later.	*Identify how the connection is protected* Protection of connections for future Phase 3 strategies to assess containment conditions and deploy equipment to depressurize/cool containment will be identified later.

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D. Maintain Containment
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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E. Maintain Spent Fuel Pool Cooling

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

- **Makeup with Portable Injection Source**

E.1 - PWR Installed Equipment Phase 1:

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

Following the occurrence of an ELAP/LUHS event, normal SFP cooling capability is lost which, in the long term, can result in SFP boiling and loss of adequate SFP level for adequate spent fuel cooling. Conservative analysis has shown that, based on the limiting fuel storage scenario resulting in maximum design heat load, with no operator action, the SFP will reach 212°F in approximately 6 hours and boil off to a level 10 feet above the top of fuel in approximately 30 hours from initiation of the event.

Based on the extended time available for action to supplement SFP cooling, the Phase 1 coping strategy is to monitor SFP level, using instrumentation to be installed as required by NRC Order EA-12-051.

Details:

E.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* The Phase 1 coping strategy for SFP cooling is to monitor SFP level using instrumentation to be installed as required by NRC Order EA-12-051.
E.1.2 - Identify modifications	*List modifications* No additional modifications are required other than installation of the BDB SFP level monitoring instruments as required by NRC Order EA-12-051.
E.1.3 - Key SFP Parameter	*Per EA-12-051* <u>SFP water level</u> – water level indication will be provided in accordance with the requirements of NRC Order EA-12-051. Water level indication will be available throughout the event.

Notes:

The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

[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.

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E. Maintain Spent Fuel Pool Cooling

E.2 - PWR Portable Equipment Phase 2:

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

As described in Section E.1, Phase 1 coping for maintaining the fuel in the SFP adequately cooled following an ELAP/LUHS will be accomplished by monitoring SFP level using the BDB SFP instrumentation installed as required by NRC Order EA-12-051. SFP cooling will be maintained by providing makeup to the pool using on-site portable equipment stored in the BDB Storage Building(s). Makeup to the SFP will be required prior to 30 hours, at which time continued pool boiling is calculated to reduce the pool level to within ten feet of the top of stored fuel.

a. The primary coping strategy for SFP cooling is to utilize the fire truck or BDB High Capacity pump, deployed as described in Section B.2, to provide makeup water flow to the pool. The water will be drawn from the barge slip and pumped to the pool through a flexible hose connected to the pre-installed, seismically-designed, and missile protected SFP makeup connection located in the SFP skimmer cage in the Auxiliary Building (Figure 6). The flowpath for SFP make-up is through an existing open ended line which provides flow directly into the pool. Since the BDB SFP makeup connection is protected, and other necessary equipment is deployed from the BDB Storage Building(s), this SFP makeup capability will be available for the external hazards described in Section A.1.

b. The alternate capability for SFP makeup utilizes methods developed for compliance with 10 CFR 50.54(hh)(2) (consistent with NEI 12-06 Table D). The fire truck or the BDB High Capacity pump would provide flow from the barge slip through portable spray nozzles that will be set-up on the deck near the SFP, or through a flexible hose that will be routed over the edge of the pool. The staging of equipment within the Fuel Building can be accomplished before the SFP area becomes inaccessible since pool boiling is not anticipated until after 6 hours and Fuel Building access is expected to be available for a considerable time after boiling begins.

The BDB High Capacity pump will provide SFP makeup capability of up to 250 gpm, which exceeds the calculated boil-off rate of 75 gpm. Hydraulic analysis of the flow paths from the station discharge canal to the SFP for each of the makeup methods described above will be performed to confirm that applicable performance requirements are met. **[Open Item 3]**

Per NEI 12-06, a vent pathway for removal of steam and condensate from the SFP area is required as steam from pool boiling can condense and cause access and equipment problems in other parts of the plant. Following a BDB event, a vent pathway would be required in the event of SFP bulk boiling and can be established by opening the Fuel Building roll-up doors for inlet and outlet air flow.

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E. Maintain Spent Fuel Pool Cooling	
Details:	
E.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Site-specific procedural guidance governing the SFP cooling will be developed using industry guidance, and will address the necessary steps to deploy portable pumps and hoses, establish connections, and operate the portable equipment to perform the required function, and establish an SFP area vent pathway. **[Open Item 5]**
E.2.2 - Identify modifications	*List modifications* a. Primary strategy – A new BDB pipe connection to the existing emergency makeup water line which is located in the Auxiliary Building in the SFP Skimmer cage. **[Open Item 11]**
E.2.3 - Key SFP Parameter	*Per EA-12-051* <u>SFP water level</u> – water level indication will be provided in accordance with the requirements of NRC Order EA-12-051. Water level indication will be available throughout the event.
E.2.4 - Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.

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E. Maintain Spent Fuel Pool Cooling	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings are protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant.

E.2.5 - Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use. a. The primary coping strategy for SFP cooling is to utilize the fire truck or BDB High Capacity pump to provide makeup water flow to the pool. The water will be draw from the barge slip to the pool through a flexible hose connected to the pre-installed, seismically-designed, and missile protected SFP makeup connection installed in the Auxiliary Building which provides flow directly into the pool.	*Identify modifications* A new BDB pipe connection in the Auxiliary Building in the SFP skimmer cage will be installed. The piping will be seismically designed and missile protected. The BDB pipe connection for the SFP will tie into an existing open ended line which will discharge directly into the SFP. **[Open Item 11]**	*Identify how the connection is protected* The new BDB pipe connection in the Auxiliary Building will not be subject to flooding and will be seismically designed and missile protected.

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E. Maintain Spent Fuel Pool Cooling		
b. The alternate SFP makeup/spray strategy is implemented either by running a hose directly to the SFP area or connecting to two monitor nozzles and spraying the pool directly. Makeup water will be provided from one branch of the MPS2 water thief being supplied from the fire truck or the BDB High Capacity Pump located at the barge slip.	No modifications are required to deploy the alternate SFP makeup/spray strategy.	To implement the alternate makeup/spray strategy, all connections are made to a portable BDB pump, fire truck, hoses and spray monitors after the BDB event. The equipment, and any connections between the equipment, is protected from all external events since they are in storage until after the BDB event.

Notes:

The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0

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E. Maintain Spent Fuel Pool Cooling	
E.3 - PWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup via portable injection source) and strategy(ies) utilized to achieve this coping time. A separate Phase 3 strategy is not required to maintain SFP cooling. However, the Phase 2 SFP makeup strategies will be maintained using offsite pumps if the onsite portable pumps fail.	
Details:	
E.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* No separate strategies are required for Phase 3
E.3.2 - Identify modifications	*List modifications* No separate modifications are required for Phase 3
E.3.3 - Key SFP Parameter	*Per EA-12-051* SFP water level – water level indication will be provided in accordance with the requirements of NRC Order EA-12-051. Water level indication will be available throughout the event.

E.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Although a separate Phase 3 strategy is not required to maintain SFP cooling, pumps from the RRC may be deployed to the same Phase 2 equipment deployment location if the onsite portable pumps fail.	*Identify modifications* No separate modifications are required for Phase 3	*Identify how the connection is protected* No separate connections are required for Phase 3

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E. Maintain Spent Fuel Pool Cooling
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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F1. Safety Functions Support (Electrical)

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

F1.1 - PWR Installed Equipment Phase 1

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

Successful implementation of FLEX strategies relies on several support functions. An important support function is to maintain electrical power to key parameter monitoring instrumentation that is necessary to successfully implement planned FLEX strategies. The Phase 1 strategy to provide this support function involves extending the available electrical power from the installed Class 1E 125 VDC batteries, 201A and 201B, through reduction of DC bus loading soon after the occurrence of an ELAP/LUHS by stripping non-essential loads from the 125 VDC and the battery-backed 120 VAC vital buses. Essential instrumentation necessary for key parameter monitoring is powered by the 120 VAC vital bus circuits, which will be maintained energized by 125 VDC battery bus through the Class 1E inverters following an ELAP.

A detailed review has been performed to determine essential and non-essential loads on the safety-related 125 VDC and 120 VAC buses. Based on a review of instrumentation necessary to provide key parameter monitoring for FLEX strategies, a load list was developed to identify essential circuits. Based on this list, a battery load analysis was performed to determine the extended battery life. The analysis includes assumptions that the two trains of Class 1E DC buses on each unit would be tied together using the installed cross-tie circuit and that load stripping would begin within 45 minutes after the occurrence of an ELAP/LUHS and completed within the next 30 minutes. With load stripping and cross-tie of the battery buses, the useable battery life was calculated to be 19 hours for the MPS2 batteries.

The vital AC and DC distribution system and associated equipment is seismically-designed and installed in protected areas of the plant and is expected to remain available following an ELAP/LUHS. However, in the unlikely event of vital AC and DC infrastructure damage due a seismic event or other hazard, key parameter monitoring capability can be provided by re-powering instrument cabinets locally with portable generators.

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

Italicized text is part of the NEI standard template and is retained for information purposes.

F1. Safety Functions Support (Electrical)	
Details:	
F1.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Analysis shows that the Class 1E 125VDC batteries will provide sufficient voltage for the required Phase 1 strategy loads for a minimum 19 hours of operation for MPS2. This assumes that load stripping starts within 45 minutes after the ELAP and is completed within the next 30 minutes. Procedures currently direct the operators to strip selected non-essential loads after the unit is stabilized. However, to achieve the extended 19 hours battery life, additional load stripping will be necessary. Site specific procedural guidance governing load stripping will be developed. **[Open Item 5]**
F1.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications are required to implement Phase 1.
F1.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* MCR instrumentation is available to monitor the Class 1E vital battery bus voltage during Phase 1 of an ELAP/LUHS event. Instrumentation will be available to monitor key parameters during Phase 1 activities for up to 19 hours as a result of the successful implementation of the load stripping activities. These key parameters are listed in Sections B.1.3, C.1.3, and D.1.3.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.	

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F1. Safety Functions Support (Electrical)

F1.2 - PWR Portable Equipment Phase 2

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

Prior to depletion of the Class 1E 125 VDC batteries, vital 120 VAC circuits will be re-powered to continue to provide key parameter monitoring instrumentation using portable DGs stored on-site. Additional key parameter monitoring instrumentation, down-powered for load stripping in Phase 1, will be restored when 120 VAC re-powering is implemented.

The primary strategy for re-powering 120 VAC vital bus circuits is the deployment of two 120/240 VAC DGs per unit connected to 120 VAC vital buses through pre-installed BDB cabling, and connections. The portable 120/240 VAC DGs (and connecting power cables) will be deployed from their protected storage location to the area east of the DC switchgear room exterior door (See Figure 6). Cables will be run from the portable DGs to seismically-designed, tornado missile protected BDB connection receptacles. The BDB receptacles will be connected to a new breaker on the 120 VAC vital bus panels, VA20 and VA40 (See Figure 7). Powering of VA20 and VA40 will be shifted from the Class 1E batteries to the portable DGs one panel at a time to prevent loss of all instrumentation.

The alternate strategy for re-powering 120 VAC vital bus circuits is the connection of one 480 VAC DG to the Class 1E 480 VAC bus through pre-installed BDB cabling and connections. The 480 VAC DG would allow for recharging the Class 1E 125 VDC batteries and restoration of other AC loads in addition to the key parameter monitoring instrumentation. The 480 VAC DG (and necessary connecting power cables) will be transported to the west side of the MPS2 Turbine Building (See Figure 6). The power cables will be connected to seismically-designed, tornado missile protected BDB connection receptacles accessible through the Turbine Building doorway. The BDB connection receptacles will be connected to the Class 1E 480 VAC bus via pre-installed cable and conduit to Class 1E 480 VAC MCC breakers (See Figure 8).

The final performance criteria for the DGs will be determined by an electrical loading analysis. Cabling and connector sizing will be matched to the performance criteria. **[Open Item 15]**

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F1. Safety Functions Support (Electrical)	
F1.2 - PWR Portable Equipment Phase 2	
Details:	
F1.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-powering strategies will be developed using industry guidance. Procedures will include the necessary steps to deploy and connect the 120/240 VAC DGs and the 480 VAC DG to the BDB connection receptacles, to start the generators, and to connect selected loads to the re-powered panels and buses. **[Open Item 5]**
F1.2.2 - Identify modifications	*List modifications necessary for Phase 2.* A modification on each unit will install the BDB connection receptacles for the cables from the portable 120/240 VAC DGs. **[Open Item 11]** A modification on each unit will install the BDB connection receptacles for the cables from the portable 480 VAC DG. **[Open Item 11]**
F1.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* No instrumentation is credited to monitor the re-powered AC distribution system during Phase 2 of an ELAP event. Local instrumentation on the portable DG units will monitor the generator performance. Instrumentation will be available to monitor key parameters during Phase 2 activities as a result of the successful re-powering of the vital 120 VAC buses. These key parameters are listed in Sections B.2.3, C.2.3, and D.2.3.
F1.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from seismic events while stored in either the BDB Storage Building(s) or in seismic protected areas of the plant.

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F1. Safety Functions Support (Electrical)	
F1.2 - PWR Portable Equipment Phase 2	
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from flooding events while stored in either the BDB Storage Building(s) or in flood protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from severe storms with high wind events while stored in either the BDB Storage Building(s) or in wind/missile protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from snow, ice and extreme cold events while stored in either the BDB Storage Building(s) or in weather protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from high temperature events while stored in either the BDB Storage Building(s) or in weather protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

F1.2.5 - Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.*	*Identify modifications*	*Identify how the connection is protected*

Italicized text is part of the NEI standard template and is retained for information purposes.

F1. Safety Functions Support (Electrical)		
F1.2 - PWR Portable Equipment Phase 2		
The 120/240 VAC DG and connection cables will be transported from their storage location(s) to an area east of the DC switchgear room exterior door. Cables will be run from the portable DGs to BDB connection receptacles.	A modification will install the 120/240 VAC BDB connection receptacles at locations accessible from the area east of the DC switchgear room exterior door. The receptacles will be seismically mounted, protected from high wind/tornado missile, floods and extreme temperatures. From the receptacles, Class 1E cables and conduit will be installed to a transfer switch in the supply cable to panels VA20 and VA40. **[Open Item 11]**	The 120 VAC BDB connection receptacles will be seismically mounted in a Class I structure protected from wind generated missiles, flooding and extreme temperatures. Therefore, the connection is protected from the extreme external hazards identified in Section A.1.
b. The 480 VAC DG will be transported from a BDB Storage Building to the area west of the MPS2 Turbine Building. The power cables will be used to connect the DGs to the 480 VAC BDB connection receptacle accessible through the Turbine Building door.	A modification will install the 480 VAC BDB connection receptacles at a location accessible from the west side of the MPS2 Turbine Building. The modification will include the BDB connection receptacle and the installation of a new breaker in a spare location on Class 1E 480 VAC bus 22F. The receptacles will be seismically mounted, protected from high wind/tornado missile, floods and extreme temperatures. From the receptacles, Class 1E cables and conduit will be installed to the 480 VAC bus. **[Open Item 11]**	The 480 VAC BDB connection receptacles will be seismically mounted in a Class I structure protected from wind generated missiles, flooding and extreme temperatures. Therefore, the connection is protected from the extreme external hazards identified in Section A.1.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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F1. Safety Functions Support (Electrical)
F1.3 - PWR Portable Equipment Phase 3
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. The Phase 3 coping strategy is to obtain additional electrical capability and redundancy for on-site equipment until such time that normal power to the site can be restored. This will be provided by a 4160 VAC portable DG as described below. <u>4160 VAC Diesel Generator</u> - One 4160 VAC mobile DG will be brought in from the RRC in order to supply power to a Class 1E 4160 VAC bus. The DG will be deployed to the area just north of the MPS2 Enclosure Building (See Figure 6). Power cables will be stored in the BDB Storage Building(s) and will be run from the DG to a 4160 VAC BDB connection receptacle. Cabling from the receptacle will be routed through seismically designed conduits to a new connection to the Refueling Load Center supply cables. This connection allows the non-vital 4160 VAC bus 24B to be back fed from the Refueling Load Center. Powering of bus 24B will allow for energizing the 4160 VAC vital bus 24D and 480 VAC vital bus 22F (See Figure 9). Additionally, by restoring the vital 4160 VAC bus, power can be restored to the Class 1E 480 VAC via the 4160/480 VAC transformers to power selected 480 VAC loads. The final performance criteria for the DG will be determined by an electrical loading analysis performed in accordance with the design process. Cabling and connector sizing will be matched to the performance criteria. **[Open Item 15]**

Details:	
F1.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-powering strategies will be developed using industry guidance. Procedures will include the necessary steps to connect the 4160 VAC DG to the non-vital 4160 VAC Bus, to start the generators, and to re-power the emergency buses. **[Open Item 5]**
F1.3.2 - Identify modifications	*List modifications necessary for Phase 3.* A modification on each unit will install the BDB connection at the Refueling Load Center for the cables from the portable 4160 VAC DG. **[Open Item 11]**

Italicized text is part of the NEI standard template and is retained for information purposes.

F1. Safety Functions Support (Electrical)	
F1.3 - PWR Portable Equipment Phase 3	
F1.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* No instrumentation is credited to monitor the re-powered AC distribution system during Phase 3 of an ELAP event. Local instrumentation on the portable DG unit will monitor the generator performance. Instrumentation will be available to monitor key parameters during Phase 3 activities and is the same instrumentation as for Phase 2. These key parameters are listed in Sections B.2.3, C.2.3, and D.2.3.

F1.3.4 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The 4KV portable DG will be brought in from the RRC and deployed to an area just north of the MPS2 Enclosure Building. From there, power cables will be run to the new connection on the Refueling Load Center supply cables accessible through the Enclosure Building.	*Identify modifications.* A new connection will be made to the Refuel Load Center supply that will allow it to be powered from the portable 4160 VAC DG. The Refuel Load Center will then back feed bus 24B through a transfer switch.	*Identify how the connection is protected* The connection will be to an existing load center inside the MPS2 Enclosure Building which is a Class I structure protected from wind generated missiles, flooding and extreme temperatures. Therefore, the connection will be protected from the extreme external hazards identified in Section A.1.

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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F2. Safety Functions Support (Fuel)

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

F2.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involve several elements. One element is maintaining fuel to necessary diesel powered generators, pumps, hauling vehicles, compressors, etc. The general coping strategy for supplying fuel oil to diesel driven portable equipment, i.e., pumps and generators, being utilized during Phases 2 and 3, is to draw fuel oil out of any of the existing diesel fuel oil tanks on the MPS site that are available. The coping strategy for supplying fuel oil to BDB equipment indefinitely is not unit specific. Fuel oil from any storage tank on site will be available to refill BDB equipment being utilized for either MPS2 or MPS3 service.

Details:

F2.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* No procedures or guidelines related to fueling of BDB equipment are required during Phase 1.
F2.1.2 - Identify modifications	*List modifications and describe how they support coping time* No modifications related to fueling of BDB equipment are required during Phase 1.
F2.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* There are no key parameters related to fueling of BDB equipment applicable to Phase 1

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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

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F2. Safety Functions Support (Fuel)

F2.2 - PWR Portable Equipment Phase 2

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

Fuel will be required for BDB equipment during Phase 2 and Phase 3 of the coping strategies. The primary source of fuel oil for portable equipment will be the MPS2 Diesel Day Tanks. These tanks contain a minimum of 24,000 gallons of diesel fuel. The tanks are seismically mounted and missile protected. They are located on the 38 feet 6 inch level of the MPS2 Auxiliary Building, so they are well above the flood plain. Being approximately 24 feet above (Unit 2) grade, gravity can be used to transfer the oil to drums for transporting the fuel to the portable equipment. No pumps are necessary.

A secondary source for fuel oil will be the MPS3 Diesel Fuel Oil Storage Tanks. These underground tanks contain a minimum of 32,670 gallons of fuel oil. They are seismic and missile protected. However, a pump will be required to transfer this fuel to drums.

An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed including any gasoline required for small miscellaneous equipment. **[Open Item 16]**

Details:

F2.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-fueling strategies will be developed using industry guidance, and will address the monitoring of fuel supplies and consumption in order to initiate refueling activities prior to equipment shutdown. **[Open Item 5]**
F2.2.2 - Identify modifications	*List modifications necessary for Phase 2* No modifications are required to provide fueling capabilities during Phase 2.
F2.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* The specifications for local instrumentation for portable diesel powered BDB equipment will include fuel gauges. Monitoring of fuel supplies and consumption in order to initiate refueling activities prior to equipment shutdown will be performed. (See Section F2.2.1)

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F2.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant.

F2.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Strategy**	**Strategy**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The BDB Storage Buildings(s) will have fuel carts to provide the necessary equipment to transfer fuel from storage tanks to the deployed portable equipment.	*Identify modifications* No modifications are required to provide fueling capabilities during Phase 2.	*Identify how the connection is protected* The connection to access the primary fuel supply in the re-fueling strategy are the connections from the drain valves of the MPS2 diesel day tanks located on the 38 feet 6 inches level of the MPS2

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Equipment for clearing potential obstructions which could inhibit mobility of the fuel carts and fuel transfers will also be stored within the BDB Storage Buildings(s). A pre-staged hose adapter can be connected to the drain valve of either MPS2 Day Tank. The hose then will be run through the 38 feet 6 inches level of the Auxilary Building down to the Health Physics RCA entrance area door to outside. The outside end of the hose will be fitted with a manual ball valve. The diesel fuel can then be gravity fed to suitable fuel containers. The containers will be trucked to the various portable equipment locations, where the fuel will be transferred by hand operated pumps from the fuel containers. Fuel oil can also be removed from the MPS3 Underground Storage Tanks using a portable fuel pump assembly to fill suitable fuel containers for distribution.		Auxiliary Building. These tanks are seismically designed and are located in structures that are protected from the extreme external hazards identified in Section A.1.

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F2. Safety Functions Support (Fuel)

F2.3 - PWR Portable Equipment Phase 3

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

The coping strategy for supplying fuel oil to diesel driven portable equipment, i.e., pumps and generators, is described in Section F2.2 for Phase 2 and is the same for Phase 3.

An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed and will include Phase 3 equipment developed including any gasoline required for small miscellaneous equipment. The fuel strategy will evaluate the need for additional fuel required from the RRC or other offsite sources. **[Open Item 16]**

Details:

F2.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-fueling strategies will be developed using industry guidance as stated in Section F2.2.1.
F2.3.2 - Identify modifications	*List modifications necessary for Phase 2* No modifications are required to provide fueling capabilities during Phase 3.
F2.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters related to fueling of BDB equipment applicable to Phase 3.

F2.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Same as Phase 2 as stated in Section F2.2.5.	*Identify modifications* Same as Phase 2 as stated in Section F2.2.5.	*Identify how the connection is protected* Same as Phase 2 as stated in Section F2.2.5.

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F2. Safety Functions Support (Fuel)
F2.3 - PWR Portable Equipment Phase 3
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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F3. Safety Functions Support (Lighting)

Determine Baseline coping capability with installed coping[7] modifications not including FLEX modifications.

F3.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involve several elements. One necessary element is maintaining sufficient lighting in areas needed to successfully implement the planned FLEX strategies. MPS2 initially relies on emergency lighting installed for Fire Protection/Appendix R to perform Phase 1 coping strategy activities. However, Appendix R lighting is powered by battery packs at each light and is rated for only 8 hours. This lighting also does not provide 100% coverage of areas involving FLEX strategy activities including ingress and egress from task areas. In these areas and areas poorly lit, portable lighting and head lamps are available for use. Portable lighting is currently staged throughout the site, mainly for use by the Fire Brigade.

A lighting study will be performed to validate the adequacy of existing lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions. **[Open Item 17]**

Details:

F3.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* There are no procedures, strategies, or guidelines needed with regard to use or restoration of lighting in Phase 1 of an ELAP/LUHS event. Portable lighting is currently staged throughout the site, mainly for use by the Fire Brigade. The location of these lights will be identified in the FLEX Guidelines. **[Open Item 5]**
F3.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications are planned to provide lighting to support the implementation of Phase 1 FLEX strategies. Additional portable lighting or necessary modifications may be identified in the lighting study to be performed.

[7] 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.

Italicized text is part of the NEI standard template and is retained for information purposes.

F3.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* There are no key parameters associated with the lighting systems in any phase of the ELAP/LUHS response.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.	

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F3. Safety Functions Support (Lighting)

F3.2 - PWR Portable Equipment Phase 2

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

There are three methods of providing light in areas needed to successfully implement Phase 2 FLEX strategies. First, is the continued use of the Appendix R lighting discussed in Section F3.1, however, as previously stated, this lighting is limited to approximately 8 hours. Additionally, the use of portable hand held lighting or head lamps will continue to be available for use in dark or poorly lit areas.

Second, will be the use of supplemental lights that will be available as stored BDB equipment. This includes additional small portable sources (such as flashlights and head lamps) for personal use, as well as larger portable equipment (such as self-powered light plants). The larger lighting equipment would be typically deployed in outside areas to support deployment of BDB pumps and generators. In some cases, BDB equipment will be equipped with their independent lighting sources.

A lighting study will be performed to validate the adequacy of supplemental lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions.
[Open Item 17]

Details:

F3.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing lighting strategies will be developed using industry guidance, and will address the operation and placement of supplemental lighting stored in the BDB Storage Building(s). **[Open Item 5]**
F3.2.2 - Identify modifications	*List modifications necessary for Phase 2.* No modifications to the lighting system are planned.
F3.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the lighting systems in any phase of the ELAP/LUHS response.

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F3. Safety Functions Support (Lighting)	
F3.2 - PWR Portable Equipment Phase 2	
F3.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant.
High Temperatures	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant.

F3.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Small portable lighting equipment will be distributed as needed from the BDB Storage Building(s). Large portable lighting equipment from a BDB Storage Building(s) would be deployed directly to its point of use by tow vehicles.	*Identify modifications* No modifications are needed to the site or lighting systems to support FLEX strategy implementation.	*Identify how the connection is protected* The protection of connections does not apply to existing light systems or to the supplemental lighting that may be deployed from storage.

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F3. Safety Functions Support (Lighting)		
F3.2 - PWR Portable Equipment Phase 2		
Some BDB equipment, such as pumps or generators, may have the necessary lighting to operate that equipment incorporated as part of the equipment skid and will be, therefore, deployed with the equipment.		

Notes:
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F3. Safety Functions Support (Lighting)	
F3.3 - PWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Lighting to support Phase 3 FLEX strategies will be available onsite as discussed in Section F3.2 for Phase 2 activities. No supplemental lighting will be required from off-site sources such as the RRC.	
Details:	
F3.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* There are no additional procedures, strategies, or guidance for lighting systems other than those needed for Phase 2. (Refer to Section F3.2.1)
F3.3.2 - Identify modifications	*List modifications necessary for Phase 3* No modifications to the lighting system are planned.
F3.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the lighting systems in any phase of the ELAP/LUHS response.

F3.3.4 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Refer to Section F3.2.5.	*Identify modifications* Refer to Section F3.2.5.	*Identify how the connection is protected* Refer to Section F3.2.5.

Notes:
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Dominion Nuclear Engineering ETE-CPR-2012-0009, “Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document,” Revision 0.

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F4. Safety Functions Support (Communications)

Determine Baseline coping capability with installed coping[8] modifications not including FLEX modifications.

F4.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involve several elements. One element is maintaining necessary communication to support interaction between personnel in the plant and those providing overall command and control in order to successfully implement the planned FLEX strategies. Normal communications may be lost or severely hampered during and following an ELAP event. Hand-held portable radios would be limited to line-of-sight operation due to the loss of repeater stations.

A communications study will be performed in accordance with the commitments made in response to Recommendation 9.3 of the 10 CFR 50.54(f) letter dated March 12, 2012 (Reference Letter S/N 12-205F). This study will determine the adequacy of the communications equipment available after the ELAP event and determine any additional equipment or modifications needed to implement the Phase 1 FLEX strategies. The result of this study will be provided at a later date. **[Open Item 18]**

Details:

F4.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any communications related procedures, strategies, and/or guidelines needed to support implementation of the Phase 1 coping strategies will be identified and developed at a later date.
F4.1.2 - Identify modifications	*List modifications and describe how they support coping time.* Any communications related modifications needed to support the implementation of the Phase 1 coping strategy will be identified at a later date.
F4.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* No key parameters are credited for communications during Phase 1.

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

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Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

Virginia Electric and Power Company Letter S/N 12-205F, David A. Heacock to NRC Document Control Desk, "Response to Communications Aspects of Recommendation 9.3 for Emergency Preparedness Programs," dated October 29, 2012

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)	
F4.2 - PWR Portable Equipment Phase 2	
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Communications equipment available in Phase 1 of an ELAP event will continue to be available for Phase 2 activities. Hand-held radio battery life is approximately 14-18 hours. Phase 2 BDB equipment will be used to re-power the various vital buses using portable diesel generators (120 VAC and 480 VAC) as discussed in Section F1.2. Once AC power is supplied to the 120 VAC vital buses, partial plant communications would be restored. Additional (supplemental) radios and satellite phones will be stored in BDB Storage Building(s) and will be fully charged and available for use. A communications study will be performed as stated in Section F4.1. This study will determine the adequacy of the communications equipment available after the ELAP event and will include the equipment available as a result of the re-powering of the 120 VAC vital buses. The study will determine any additional equipment or modifications needed to support the implementation of Phase 2 FLEX strategies. The result of this study will be provided at a later date. **[Open Item 18]**	
Details:	
F4.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any communications related procedures, strategies, and/or guidelines needed to support implementation of the Phase 2 coping strategies will be identified and developed at a later date.
F4.2.2 - Identify modifications	*List modifications and describe how they support coping time.* Any communications related modifications needed to support the implementation of the Phase 2 coping strategy will be identified at a later date.
F4.2.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* No key parameters are credited for communications during Phase 2.

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F4. Safety Functions Support (Communications)	
F4.2 - PWR Portable Equipment Phase 2	
F4.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant.
High Temperatures	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant.

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)

F4.2 - PWR Portable Equipment Phase 2

F4.2.5 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Supplemental communications equipment will be deployed/distributed from the BDB Storage Building(s) directly to its point of use.	*Identify modifications* Any communications related modifications needed to support the implementation of the Phase 2 coping strategy will be identified at a later date.	*Identify how the connection is protected* The protection of connections does not apply to existing or to supplemental communication equipment.

Notes:
The information provided in this section is based on the following reference(s):

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F4. Safety Functions Support (Communications)

F4.3 - PWR Portable Equipment Phase 3

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

Onsite communications equipment available in Phase 1 and 2 of an ELAP event will continue to be available for Phase 3 activities. No additional communications equipment from offsite sources is anticipated.

As stated in Section F3.1, a communications study will be performed in conjunction with the commitments made in response to Recommendation 9.3 of the 10 CFR50.54(f) letter dated March 12, 2012. This study will determine the adequacy of the communications equipment available after the ELAP event and determine any additional equipment or modifications needed to implement the Phase 1and Phase 2 FLEX strategies. The study also addresses communication capability to offsite persons and emergency response organizations. The study will address the ability to communicate with the RRC, offsite suppliers (such as fuel), and with transportation vehicles used to bring equipment and supplies to the site. This capability will be required to successfully coordinate the receipt of Phase 3 equipment as required. (Refer to Section A.9) The result of this study will be provided at a later date. **[Open Item 18]**

Details:

F4.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any communications related procedures, strategies, and/or guidelines needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be identified by the communications study and developed at a later date.
F4.3.2 - Identify modifications	*List modifications and describe how they support coping time.* Any communications related modifications needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be identified by the communications study.
F4.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* No key parameters are credited for communications during Phase 3.

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)		
F4.3 - PWR Portable Equipment Phase 3		
F4.3.4 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Any communications related equipment identified by the communications study as needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be deployed/ distributed from the BDB Storage Building(s) directly to its point of use.	*Identify modifications* Any communications related modifications needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be identified by the communications study.	*Identify how the connection is protected* The protection of connections does not apply to existing or to supplemental communication equipment.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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F5. Safety Functions Support (Ventilation)

Determine Baseline coping capability with installed coping[9] modifications not including FLEX modifications.

F5.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involve several elements. One element is to ensure that ventilation, heating, and cooling is adequate to maintain acceptable environmental conditions for equipment operation and personnel habitability. Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date. **[Open Item 19]**

Details:

F5.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any ventilation related procedures, strategies, and/or guidelines needed to support implementation of the Phase 1 coping strategies will be identified and developed at a later date.
F5.1.2 - Identify modifications	*List modifications and describe how they support coping time.* Any ventilation related modifications needed to support the implementation of the Phase 1 coping strategy will be identified at a later date.
F5.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* Key ventilation parameters will be identified at a later date.

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

[9] 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.

Italicized text is part of the NEI standard template and is retained for information purposes.

F5. Safety Functions Support (Ventilation)	
F5.2 - PWR Portable Equipment Phase 2	
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date. **[Open Item 19]**	
Details:	
F5.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Any ventilation related procedures, strategies, and/or guidelines needed to support implementation of the Phase 2 coping strategies will be identified and developed at a later date.
F5.2.2 - Identify modifications	*List modifications necessary for Phase 2* Any ventilation related modifications needed to support the implementation of the Phase 2 coping strategies will be identified at a later date.
F5.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* Key ventilation parameters will be identified at a later date.

F5.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.

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Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

F5.2.5 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The deployment strategy for equipment needed to maintain acceptable environmental conditions for equipment operation and personnel habitability will be developed in accordance with the guidance of NEI 12-06 and will be provided at a later date after the ventilation needs are identified. **[Open Item 19]**	*Identify modifications* Any ventilation related modifications needed to support the implementation of the Phase 2 coping strategies will be identified at a later date.	*Identify how the connection is protected* Any ventilation related connections (and their protections requirements) needed to support the implementation of the Phase 2 coping strategies will be identified at a later date.

Notes:
The information provided in this section is based on the following reference(s):

Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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<table>
<tr><th colspan="2">F5. Safety Functions Support (Ventilation)</th></tr>
<tr><th colspan="2">F5.3 - PWR Portable Equipment Phase 3</th></tr>
<tr><td colspan="2">Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date. [Open Item 19]</td></tr>
<tr><th colspan="2">Details:</th></tr>
<tr><td>F5.3.1 - Provide a brief description of Procedures / Strategies / Guidelines</td><td>Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.

Any ventilation related procedures, strategies, and/or guidelines needed to support implementation of the Phase 3 coping strategies will be identified and developed at a later date.</td></tr>
<tr><td>F5.3.2 - Identify modifications</td><td>List modifications necessary for Phase 3

Any ventilation related modifications needed to support the implementation of the Phase 3 coping strategies will be identified at a later date.</td></tr>
<tr><td>F5.3.3 - Key Parameters</td><td>List instrumentation credited or recovered for this coping evaluation.

Key ventilation parameters will be identified at a later date.</td></tr>
</table>

<table>
<tr><th colspan="3">F5.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)</th></tr>
<tr><th>Strategy</th><th>Modifications</th><th>Protection of connections</th></tr>
<tr><td>a. Identify Strategy including how the equipment will be deployed to the point of use.
The deployment strategy for equipment needed to maintain acceptable environmental conditions for equipment operation and personnel habitability will be developed in accordance with the guidance of NEI 12-06 and provided at a later date after the ventilation needs are identified.
[Open Item 19]</td><td>Identify modifications

Any ventilation related modifications needed to support the implementation of the Phase 3 coping strategies will be identified at a later date.</td><td>Identify how the connection is protected

Any ventilation related connections (and their protections requirements) needed to support the implementation of the Phase 3 coping strategies will be identified at a later date.</td></tr>
</table>

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F5. Safety Functions Support (Ventilation)
F5.3 - PWR Portable Equipment Phase 3
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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F6. Safety Functions Support (Accessibility)

Determine Baseline coping capability with installed coping[10] modifications not including FLEX modifications.

F6.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involve several elements. One element is the ability to access site areas required to successfully implement the planned FLEX strategy.

The potential impairments to required access are: 1) doors and gates, and 2) site debris blocking personnel or equipment access. The coping strategy to maintain site accessibility through doors and gates is applicable to all phases of the FLEX coping strategies, but is immediately required as part of Phase 1.

Doors and gates serve a variety of barrier functions on the site. One primary function is security and is discussed below. However, other barrier functions include fire, flood, radiation, ventilation, tornado, and high energy line break (HELB). As barriers, these doors and gates are typically administratively controlled to maintain their function as barriers during normal operations. Following an ELAP event, FLEX coping strategies require the routing of hoses and cables to be run through various barriers in order to connect BDB equipment to station fluid and electric systems. For this reason, certain barriers (gates and doors) will be opened and remain open. This violation of normal administrative controls is acknowledged and is acceptable during the implementation of FLEX coping strategies.

The security doors and gates of concern are those barriers that rely on electric power to operate opening and/or locking mechanisms. The ability to open doors for ingress and egress, ventilation, or temporary cables/hoses routing will be necessary to implement the FLEX coping strategies. The Security force will initiate an access contingency upon loss of the Security Diesel and all AC/DC power as part of the Security Plan. Access to the Owner Controlled Area, site PA, and areas within the plant structures will be controlled under this access contingency.

Vehicle access to the PA is via the double gated sally-port at the Security building. As part of the Security access contingency, the sally-port gates will be manually controlled to allow delivery of BDB equipment (e.g., generators, pumps) and other vehicles such as debris removal equipment

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

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into the PA. A significant impairment may be debris on site resulting from BDB seismic, high wind (tornado), or flooding events. This is addressed in Section F6.2 as part of the Phase 2 coping strategy.	
Details:	
F6.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* An access contingency in the MPS Security Plan for loss of power situations ensures the ability of plant personnel and BDB equipment to access areas inside the plant structures as well as access from areas outside the site PA to implement the planned FLEX strategies.
F6.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications to ensure site accessibility are planned.
F6.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* There are no key parameters associated with the site accessibility in any phase of the ELAP/LUHS response.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.	

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F6. Safety Functions Support (Accessibility)
F6.2 - PWR Portable Equipment Phase 2
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. The potential impairments to required access are: 1) doors and gates, and 2) site debris blocking personnel or equipment access. The coping strategy to maintain site accessibility through doors and gates is applicable to all phases of the FLEX coping strategies. The deployment of onsite BDB equipment to implement coping strategies beyond the initial plant capabilities (Phase 1) requires that pathways between the BDB Storage Building(s) and various deployment locations be clear of debris resulting from seismic, high wind (tornado), or flooding events. Preferred travel pathways will be determined using the guidance contained in NEI 12-06. The pathways will attempt to avoid areas with trees, power lines, and other potential obstructions and will consider the potential for soil liquefaction. **[Open Item 20]** However, debris can still interfere with these preferred travel paths. Debris removal equipment will be kept in the BDB Storage Building(s) so that it will be protected from the severe storm, earthquake and flood hazards. Therefore, the debris removal equipment remains functional and deployable to clear obstructions from the travel pathways to the BDB equipment's deployed location(s). The stored BDB equipment includes tow vehicles (small tractors) equipped with front end buckets and rear tow connections in order to move or remove debris from the needed travel paths. A front end loader will also be available to deal with more significant debris conditions.

Details:	
F6.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing debris removal strategies will be developed to direct activities to ensure that travel pathways are cleared as necessary for deployment of BDB equipment. **[Open Item 5]**
F6.2.2 - Identify modifications	*List modifications necessary for Phase 2.* No modifications to ensure site accessibility are planned.

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F6. Safety Functions Support (Accessibility)	
F6.2 - PWR Portable Equipment Phase 2	
F6.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the site accessibility in any phase of the ELAP/LUHS response.
F6.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from seismic events while stored in the BDB Storage Building(s).
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from flooding events while stored in the BDB Storage Building(s).
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from severe storms with high wind events while stored in the BDB Storage Building(s).
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from snow, ice and extreme cold events while stored in BDB Storage Building(s) to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from high temperature events while stored in the BDB Storage Building(s) to ensure equipment readiness at extreme temperatures when called upon.

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F6. Safety Functions Support (Accessibility)		
F6.2 - PWR Portable Equipment Phase 2		
F6.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Site accessibility will be necessary for the successful deployment of BDB equipment to respond to an ELAP/LUHS event. Security procedures contain contingencies to provide access through site security barriers and debris removal equipment will be available to clear travel pathways as needed.	*Identify modifications* No modifications are needed to support site accessibility for the implementation of the planned FLEX strategy.	*Identify how the connection is protected* The protection of connections is not applicable to the site accessibility strategy.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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F6. Safety Functions Support (Accessibility)	
F6.3 - PWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. The potential impairments to required access are: 1) door and gate barriers, and 2) site debris blocking personnel or equipment access. The coping strategy to maintain site accessibility through gates and doors is applicable to all phases of the FLEX strategy and is discussed in Section F6.1. Debris removal is addressed in the deployment of the on-site Phase 2 BDB equipment and is discussed in Section F6.2. Phase 3 involves the receipt of equipment from offsite sources including the RRC and various commodities such as fuel and supplies. Transportation of these deliveries can be through airlift or via ground transportation. Debris removal for the pathway between the site and the RRC receiving location and from the various plant access routes may be required. The same debris removal equipment used for on-site pathways would be used. Evaluation and development of coordination with the RRC will be performed and document as described in Section A.9.	
Details:	
F6.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* The procedural guidance developed for Phase 2 will be applicable to debris removal activities in Phase 3.
F6.3.2 - Identify modifications	*List modifications necessary for Phase 3.* No modifications to ensure site accessibility are planned.
F6.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the site accessibility in any phase of the ELAP/LUHS response.

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F6. Safety Functions Support (Accessibility)		
F6.3 - PWR Portable Equipment Phase 3		
F6.3.4 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Site accessibility will be necessary for the successful deployment of BDB equipment to respond to an ELAP/LUHS event. Security procedures contain contingencies to provide access through site security barriers and debris removal equipment will be available to clear travel pathways as needed.	*Identify modifications.* No modifications are needed to support site accessibility for the implementation of the planned FLEX strategy.	*Identify how the connection is protected.* The protection of connections is not applicable to the site accessibility strategy.
Notes: The information provided in this section is based on the following reference(s): Dominion Nuclear Engineering ETE-CPR-2012-0009, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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Table 1 - PWR Portable Equipment Phase 2 [1] [Open Item 21]

Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment [2]	Core	Containment **[Open Item 14]**	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
BDB High Capacity pump (2) and associated hoses and fittings	**X**		**X**			1200 gpm[4]	Will follow EPRI template requirements
BDB AFW pump (4) and associated hoses and fittings [8]	**X**					300 gpm[4]	Will follow EPRI template requirements
BDB RCS Injection pump (4) and assoc.associated hoses and fittings	**X**					40 gpm[4]	Will follow EPRI template requirements
120 VAC generators (4) and associated cables, connectors and switchgear (to re-power Instrumentation)				**X**		10 kW[5]	Will follow EPRI template requirements
120 VAC generators (4) and associated cables, connectors and switchgear (to provide support equipment) [3]					**X**	10 kW[5]	Will follow EPRI template requirements
480 VAC generators (2) and associated cables, connectors and switchgear (re-power battery chargers, inverters, and vital buses) [6]				**X**		300-350 kW[5]	Will follow EPRI template requirements
Cables for 4160 VAC generator connections (4 sets)				**X**	**X**		
Portable boric acid batching tanks (4)	**X**					1000 gal	
Light plants (4) [3]					**X**		
Front end loader (2) [3]					**X**		

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Table 1 - PWR Portable Equipment Phase 2 [1] [Open Item 21]							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment [2]	Core	Containment **[Open Item 14]**	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Tow vehicles – tractors (2) [3]					**X**		
Hose trailer or utility vehicle (2) [3]					**X**		
Fans / blowers/heaters (2 sets) [3]					**X**		
Air compressors (4) [3]					**X**		
Fuel carts with pump (2) [3]					**X**		
Communications equipment (2 sets) [3,7]					**X**		
Misc. debris removal equipment (1 set) [3]					**X**		
Misc. support equipment (2 sets) [3]					**X**		

Notes:

1. The number of storage buildings and associated design requirements has not been determined **[Open Item 4]**. For the purposes of this table two storage buildings have been assumed.
2. Indicated quantities are station totals for both MPS2 and MPS3.
3. Support equipment. Not required to meet N+1.
4. Preliminary performance criteria. Final performance criteria will be determined by the hydraulic analysis performed in accordance with the design process. **[Open Item 3]**
5. Preliminary performance criteria. Final performance criteria will be determined by the electrical loading analysis performed in accordance with the design process. **[Open Item 15]**
6. 480 VAC generators are an alternate strategy to the 120/240 VAC generators. Therefore, only N are required.
7. Equipment purchase in response to the results of Recommendation 9.3 of the 10 CFR50.54(f) letter dated March 12, 2012.
8. Unit 2 will have one of the BDB AFW pumps pre-staged in the upper levels of the Turbine Building.

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Table 2 - PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
BDB RCS Injection pump (1) and associated hoses and fittings	**X**					40 gpm	2
4160 VAC generators (2), cables, and associated switchgear.				**X**	**X**	2.5-3 MW	1, 3

Notes:

1. Indicated quantities are station totals for both MPS2 and MPS3.
2. Preliminary performance criteria. Final performance criteria will be determined by the hydraulic analysis performed in accordance with the design process. **[Open Item 3]**
3. Preliminary performance criteria. Final performance criteria will be determined by the electrical loading analysis performed in accordance with the design process. RRC equipment will meet the required performance criteria. **[Open Item 15]**

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Table 3 - Phase 3 Response Equipment/Commodities

Item	Notes
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	No radiation protection equipment from offsite (Phase 3) is anticipated.
Commodities • Food • Potable water	No food/water from offsite (Phase 3) is anticipated.
Fuel Requirements	An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed and will include Phase 3 equipment. The fuel strategy will evaluate the need for additional fuel required from the RRC or other offsite sources. **[Open Item 16]**
Heavy Equipment • **Transportation equipment** • **Debris clearing equipment**	From Table 1, transportation and debris clearing equipment is available onsite (Phase 2).

Attachment 1A
Sequence of Events Timeline

Action Item	Elapsed Time	Action	Time constraint Y/N	Remarks/Applicability
	0	Event Starts	NA	Plant @ 100% power
1	15 sec	Post Trip Procedure (EOP 2525) entered	N	Standard post-trip action response. [a]
2	5 min	Start TDAFW pump. Verify AFW flow established.	N	SBO event required response. 50 min to SG dryout. [a]
3	15 min	Identification of Loss of All Power (EOP 2530 entered for SBO)	N	In accordance with post-trip procedure. [a]
4	25 min	Verify RCS Isolation	N	Establishes long term inventory in the RCS. [a]
5	45 min	ELAP Declared	N/A	
6	50 min	Control SG ADVs and AFW flow [a]	N	On-going action for cooldown and decay heat removal – operations personnel remain stationed locally.
7	**75 min**	**DC load stripping completed**	**Y**	**Starts at 45 min, completed in 30 min. to provide battery life of 19 hrs.**
8	**2.6 hrs**	**Control AFW flowrate to SGs to prevent overfill**	**Y**	**2.6 hrs to SG overfill**
9	6 hrs	Augmented Staff on Site	N/A	Reference NEI 12-01
10	**7.2 hrs**	**Deploy BDB High Capacity pump to Barge Slip, initiate flow from Long Island Sound**	**Y**	**Prior to depletion of CST volume (7.2 hrs).**
11	12 to 24 hrs	Deploy BDB AFW pumps	N	The BDB AFW pump is pre-staged in standby as a back-up to the TDAFW pump
12	**19 hrs**	**Repower 120 VAC vital buses[b]**	**Y**	**Batteries depleted in 19 hours.**
13	~26 hrs	Begin receiving equipment from RRC	N	24 hrs after request
14	28 hrs	Deploy portable boric acid batching tank	N	Deployed if the RWST is not available
15	**30 hrs**	**Add inventory to SFP**	**Y**	**6 hours to boiling / 30 hours to water level at 10 ft. above fuel. This is an ongoing activity.**
16	**32 hrs**	**Initiate RCS injection for inventory make-up / reactivity control using the BDB RCS Injection pump**	**Y**	**32 hrs (RCS Inventory Make-up: to prevent loss of natural circulation) / Reactivity control: Not required if SG pressure is maintained >120 psig**
17	**> 7 days**	**Reduce pressure and temperature in Containment**	**Y**	**Prior to affecting the function of key parameter monitoring instrumentation.**

[a] Previously evaluated in response to 10 CFR50.63 and in accordance with existing procedures.
[b] The primary strategy is to use the 120 VAC generators The 480 VAC generator is an alternate for the 120 VAC generators.

Attachment 1B
NSSS Significant Reference Analysis Deviation Table

Item	Parameter of interest	WCAP value (WCAP-17601-P August 2012 Revision 0)	WCAP section	Plant applied value	Gap and discussion
1	Applicable computer code for NSSS analysis	CENTS	Section 4.1.2.2.1	CENTS	Section 5.5.2 of WCAP-17601 (Case 21) provides results for MPS-2 with a cooldown and depressurization of the RCS.
2	RCS leakage	1 gpm	Section 4.2.1	1 gpm	No deviation
3	RCP leakage	15 gpm/RCP	Section 4.4.2	<15 gpm/RCP	This is the maximum control bleed off (CBO). CBO is isolated in EOP 2530.
4	Number of SGs used to establish natural circulation	Two - Symmetric	Section 4.2.1	Two - Symmetric	Section 5.5.2 of WCAP-17601 (Case 21) provides results for MPS-2 with a cooldown and depressurization of the RCS.
5	Total Turbine Driven AFW flow	288 gpm Total (Min. Assumed)	Section 4.2.3.2.5 Table 4.2.3.2.5-1	Minimum Available is 306 gpm Total @ 1060 psia	Adequate to establish and maintain NR level. Minimum delivered AFW capability exceeds AFW requirements for decay heat removal and RCS cooldown.
6	Start Cooldown and cooldown rate	2 hours @ 75°F/hr	Section 4.1.2 Section 5.5.2 Case 21	2 hours @ 75°F/hr to a SG pressure of 135 psia (120 psig)	Section 5.5.2 of WCAP-17601 (Case 21) provides results for MPS-2 with a cooldown and depressurization of the RCS at 2 hours @ 75°F/hr to a SG pressure of 135 psia.

Attachment 2A
Milestone Schedule

Millstone Power Station – MPS2 - Full Compliance Date: October 2015

TASK	Feb-13	Mar-13	Apr-13	May-13	Jun-13	July-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	June-14	July-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	June-15	July-15	Aug-15	Sep-15	Oct-15	Nov-15
6-month Status Update							■						■						■						■						■			
Submit Integrated Plan	■																																	
Develop Strategies	■	■	■	■	■	■																												
Develop Mods	■	■	■	■	■	■	■	■	■	■	■	■	■																					
Implement Mods							■	■	■	■	■	■	■	■	■	■	■	■	■															
Develop Training Plan			■	■	■	■	■	■	■	■	■	■	■	■	■																			
Implement Training												■	■	■	■	■	■	■	■															
Issue FSGs and Associated Procedure Revisions																				■														
Develop Strategies/ Contract with RRC	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■																			
Purchase Equipment												■	■																					
Procure Equipment																■	■	■	■															
Create Maintenance Procedures												■	■	■	■	■	■	■	■															
Outage Implementation															■																		■	

Attachment 2B
Open Items

Open Item #	Description	Completion Schedule[1]
1	Verify response times listed in timeline and perform staffing assessment.	December, 2014
2	Preliminary analyses have been performed to determine the time to SG overfill without operator action to reduce AFW flow, time to SG dryout without AFW flow, and time to depletion of the CST. Final durations will be provided when the analyses are completed.	June, 2013
3	Analyses will be performed to develop fluid components performance requirements and confirm fluid hydraulic-related strategy objectives can be met.	September, 2013
4	A study is in progress to determine the design features, site location(s), and number of equipment storage facilities. The final design for BDB equipment storage will be based on the guidance contained in NEI 12-06, Section 11.3, Equipment Storage. A supplement to this submittal will be provided with the results of the equipment storage study.	June, 2013
5	FSGs will be developed in accordance with PWROG guidance. Existing procedures will be revised as necessary to implement FSGs.	Sseptember, 2014
6	EPRI guidance documents will be used to develop periodic testing and preventative maintenance procedures for BDB equipment. Procedures will be developed to manage unavailability of equipment such that risk to mitigating strategy capability is minimized.	December, 2014
7	An overall program document will be developed to maintain the FLEX strategies and their bases, and provide configuration control and change management for the FLEX Program.	December, 2014
8	The Dominion Nuclear Training Program will be revised to assure personnel proficiency in the mitigation of BDB events is developed and maintained. These programs and controls will be developed and implemented in accordance with the SAT.	December, 2014
9	Confirm consistency of the FLEX strategies with the PWROG evaluation of post-loss of all AC power plant response for Combustion Engineering plants.	TBD
10	Develop strategy for use of the BDB AFW Pump to provide SG injection in the unlikely event of loss of TDAFW pump due to hurricane related storm surge flooding of the Turbine Building.	December, 2013

Attachment 2B
Open Items

Open Item #	Description	Completion Schedule[1]
11	Plant modifications will be completed for permanent plant changes required for implementation of FLEX strategies.	See Milestone Schedule
12	Complete the engineering evaluation of the tornado missile protection of MS ADV outlet lines.	December, 2013
13	Complete the evaluation of TDAFW pump long term operation with </= 120 psig inlet steam pressure.	December, 2013
14	The Phase 3 coping strategy to maintain containment integrity is under development. Methods to monitor and evaluate containment conditions and depressurize/cool containment, if necessary, will be provided in a future update.	December, 2013
15	Analyses will be performed to develop electrical components performance requirements and confirm electrical loading-related strategy objectives can be met.	September, 2013
16	An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed.	June, 2014
17	A lighting study will be performed to validate the adequacy of supplemental lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions.	June, 2014
18	A communications study will be performed in accordance with the commitments made in response to Recommendation 9.3 of the 10 CFR 50.54(f) letter dated March 12, 2012 in Dominion letter S/N 12-208F dated October 29, 2012.	Consistent with Rec 9.3 commitment dates
19	Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date.	September, 2013
20	Preferred travel pathways will be determined using the guidance contained in NEI 12-06. The pathways will attempt to avoid areas with trees, power lines, and other potential obstructions and will consider the potential for soil liquefaction.	June, 2014
21	The equipment listed in Table 1 will be procured.	June, 2014

NOTES: 1. The completion status of open items, or any necessary changes to the completion schedule dates, will be provided in the planned 6-month status reports submitted in accordance with Order EA-12-049, Condition C.2.

Attachment 3
Conceptual Sketches

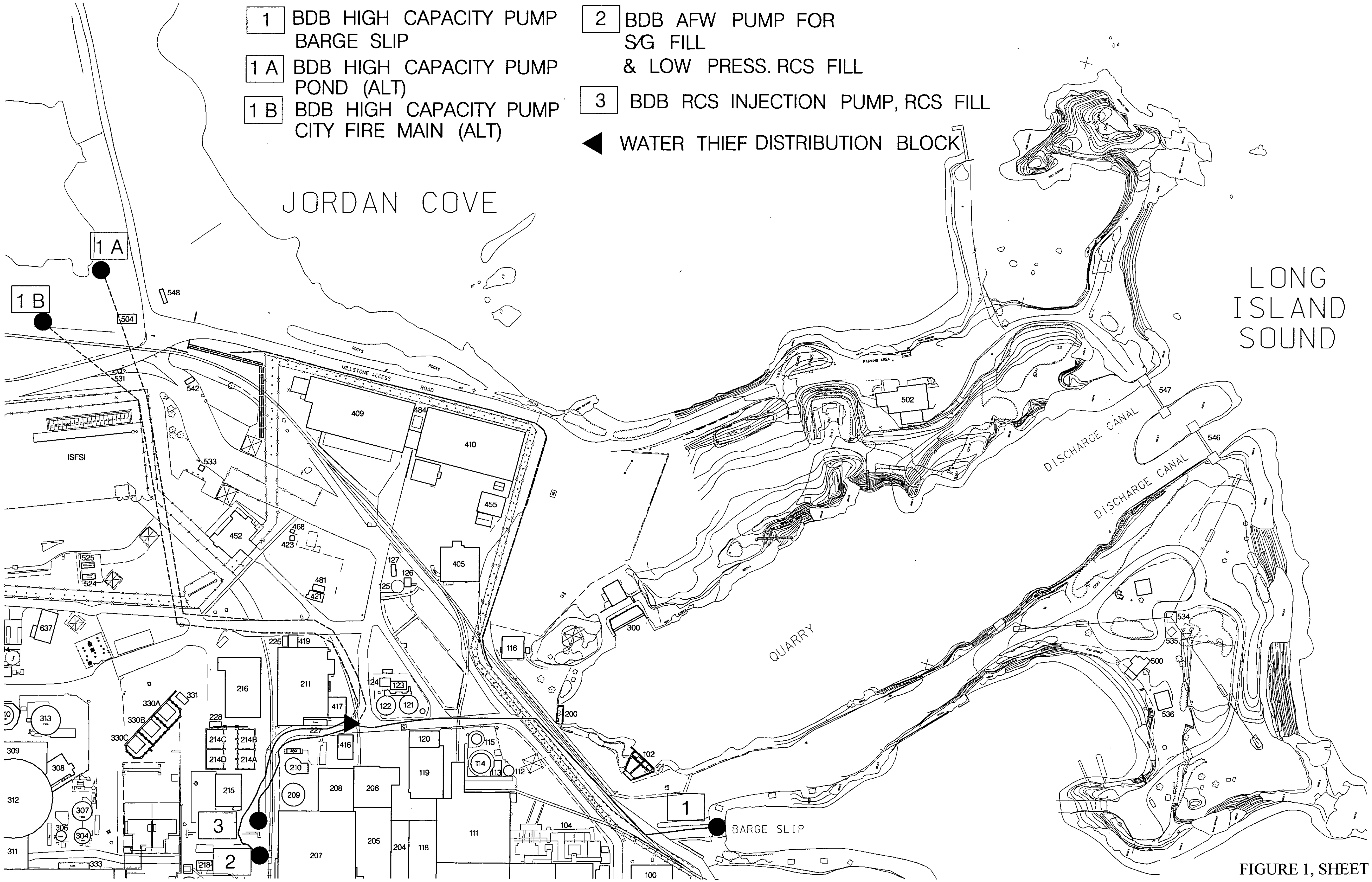

FIGURE 1, SHEET A
BDB EQUIPMENT AND HOSE LAYOUT
MILLSTONE UNIT 2

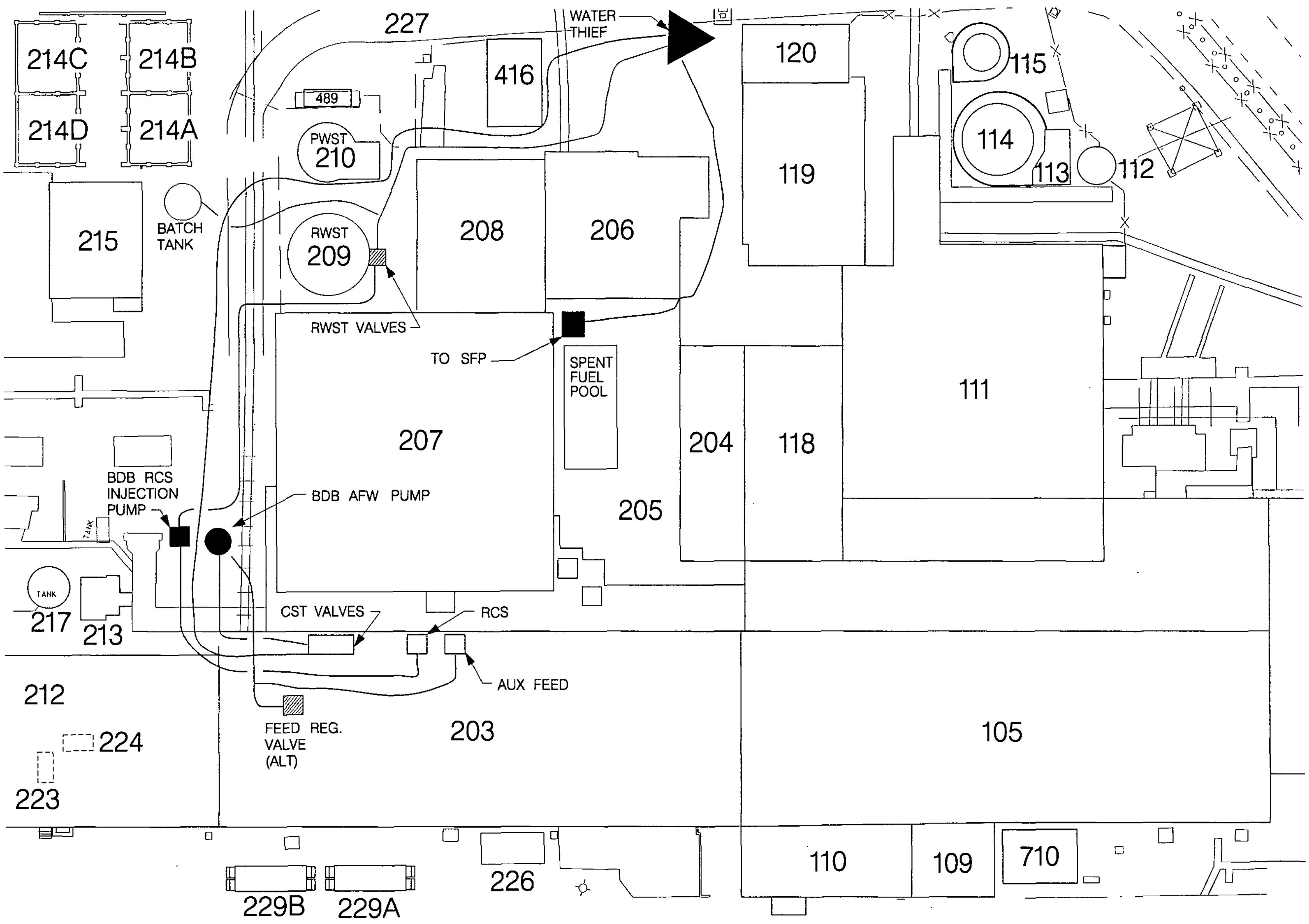

FIGURE 1, SHEET B
BDB EQUIPMENT AND
HOSE LAYOUT (ENLARGED VIEW)
MILLSTONE UNIT 2

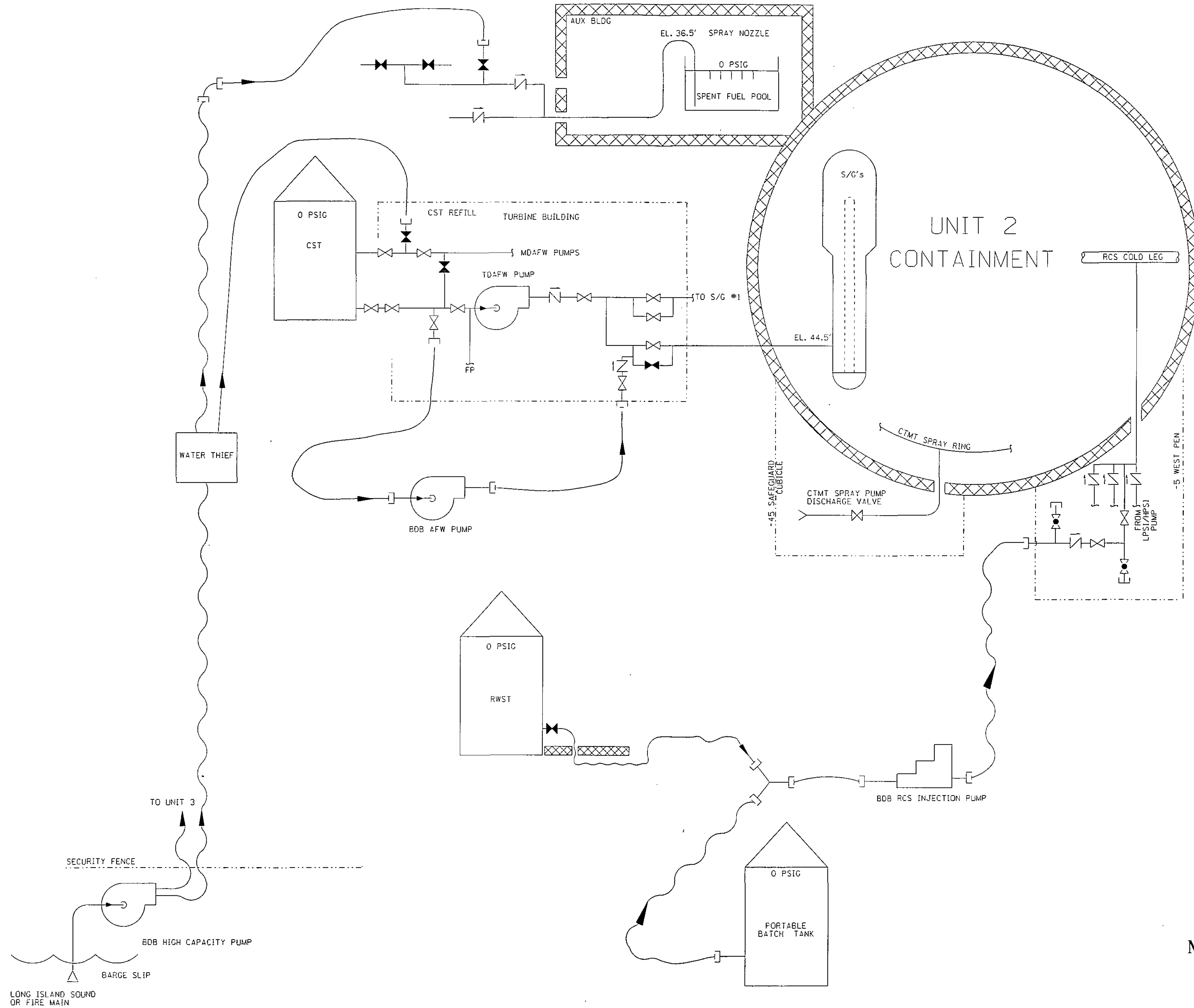

FIGURE 2
BDB FLEX STRATEGY
MECHANICAL CONNECTIONS FLOW DIAGRAM
MILLSTONE UNIT 2

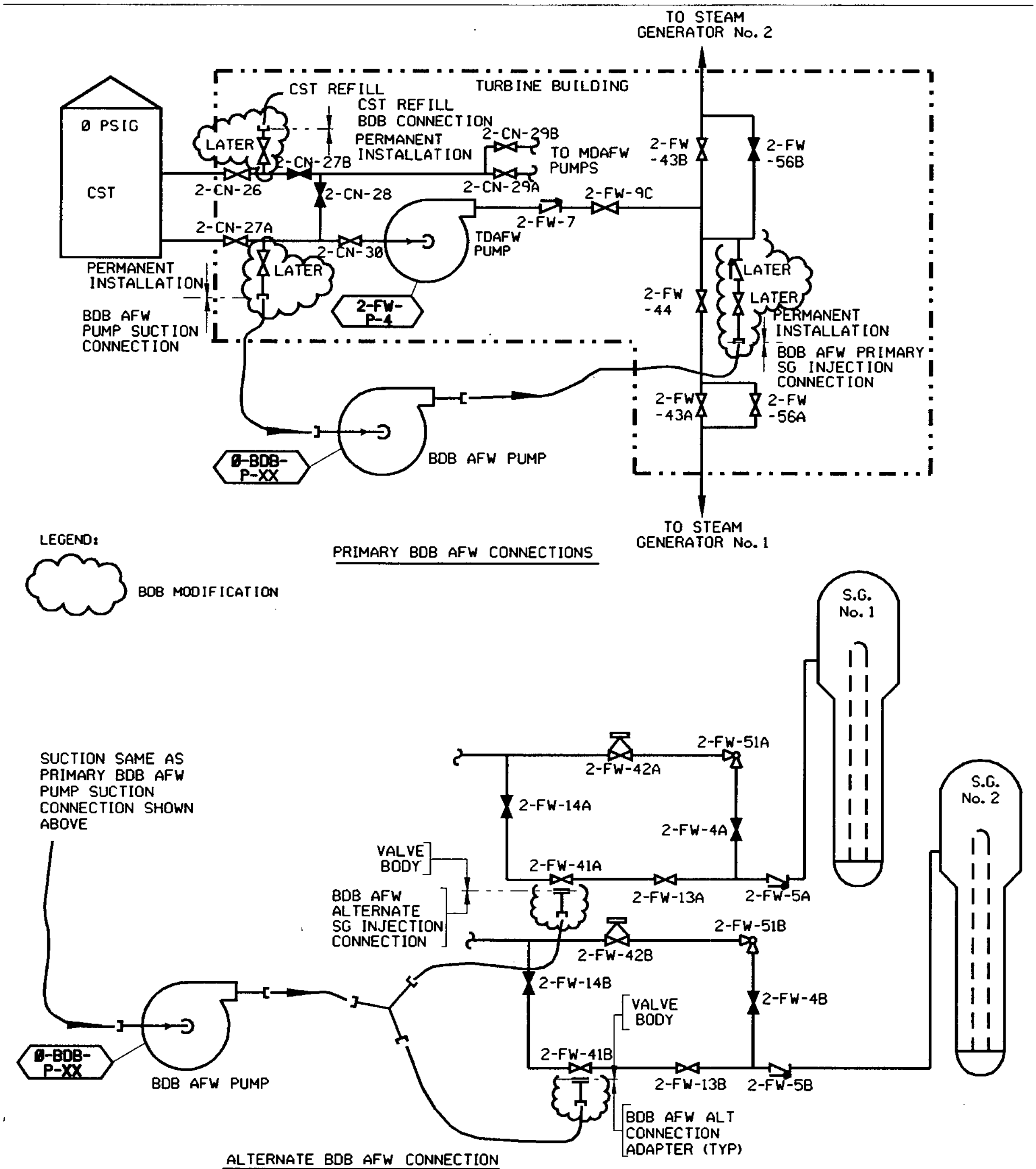

FIGURE 3
CORE COOLING AND DECAY HEAT REMOVAL
MILLSTONE UNIT 2

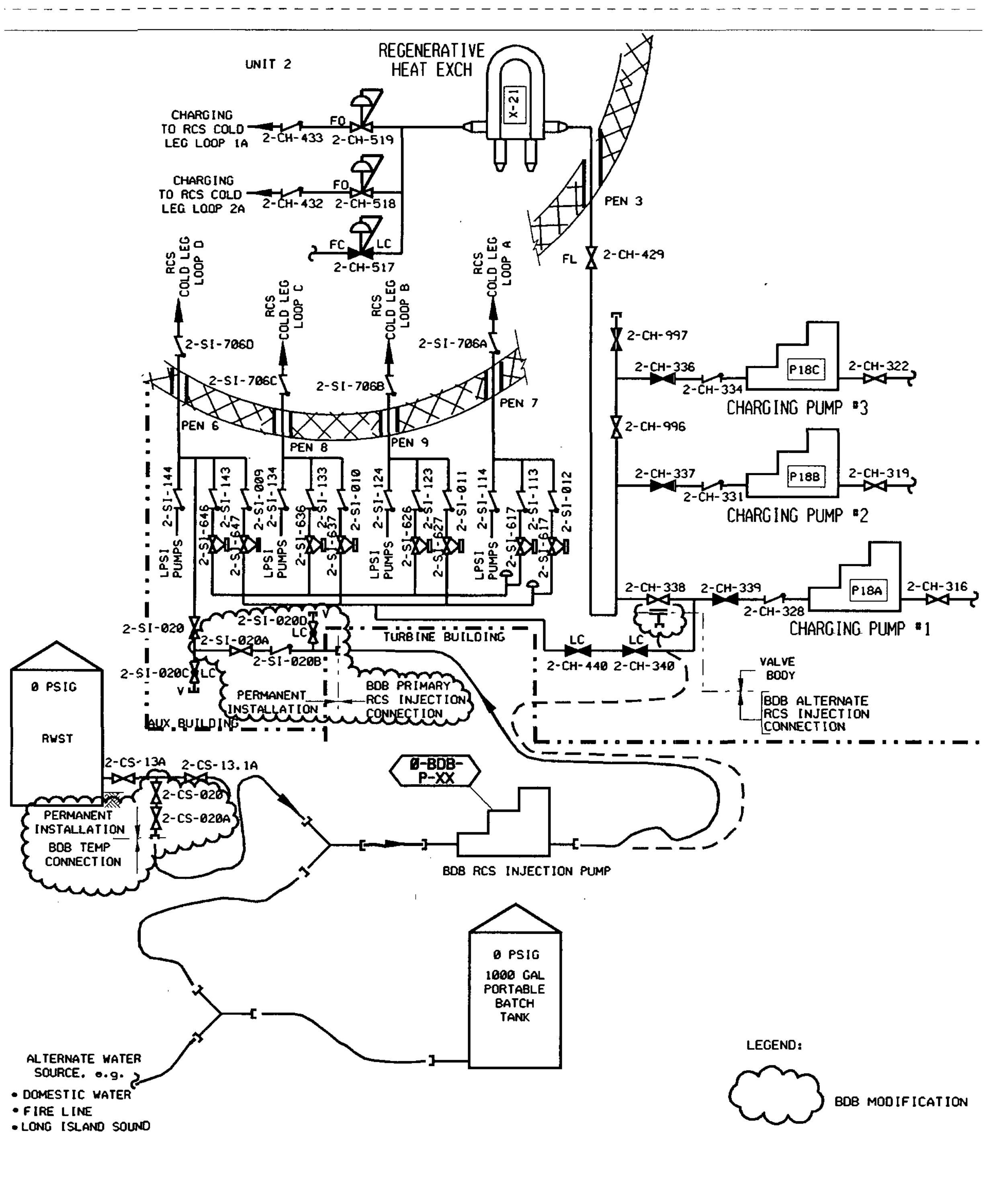

FIGURE 4
RCS MAKEUP - MECHANICAL CONNECTIONS
MILLSTONE UNIT 2

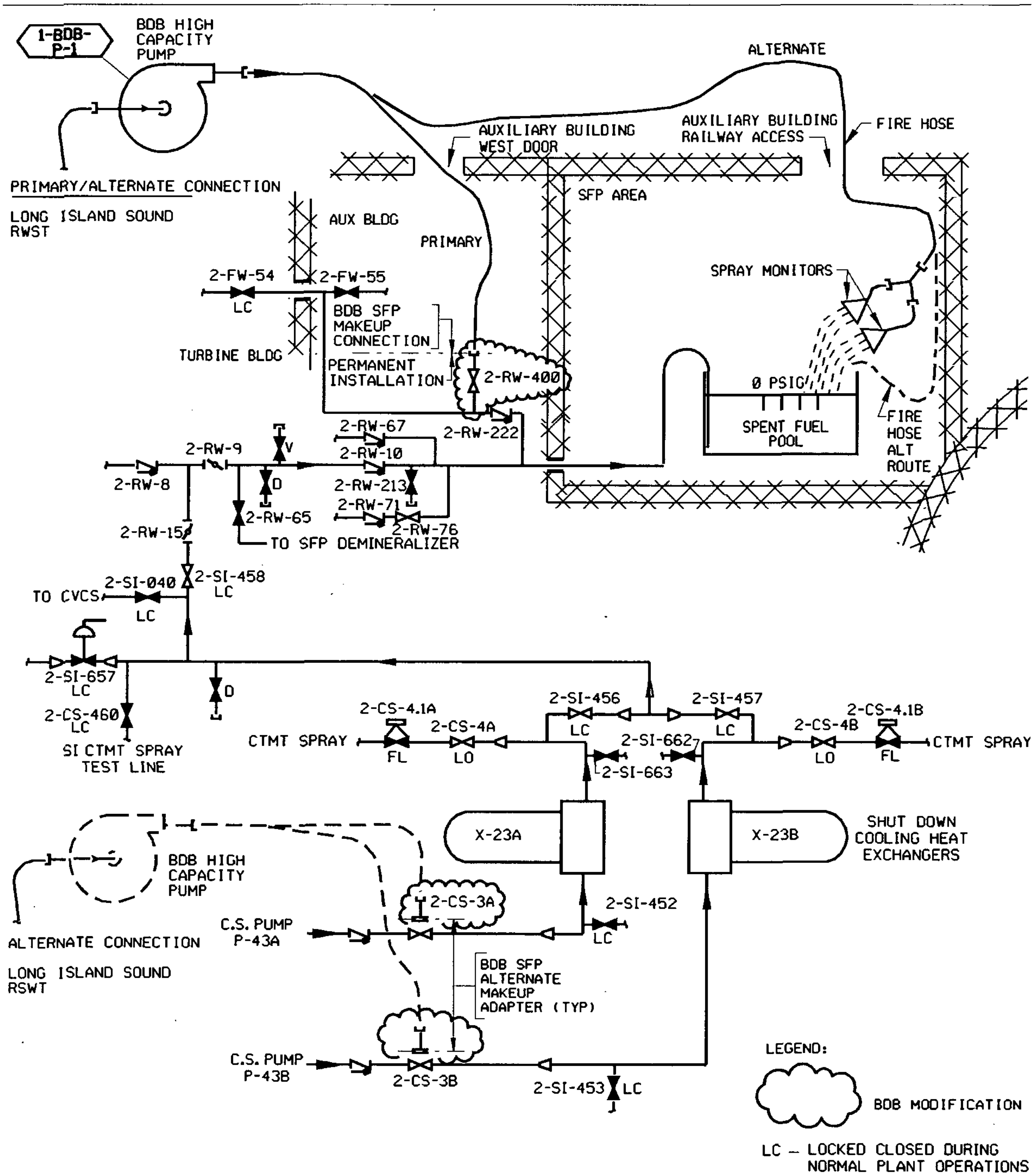

FIGURE 5
SPENT FUEL POOL COOLING
MECHANICAL CONNECTIONS
MILLSTONE UNIT 2

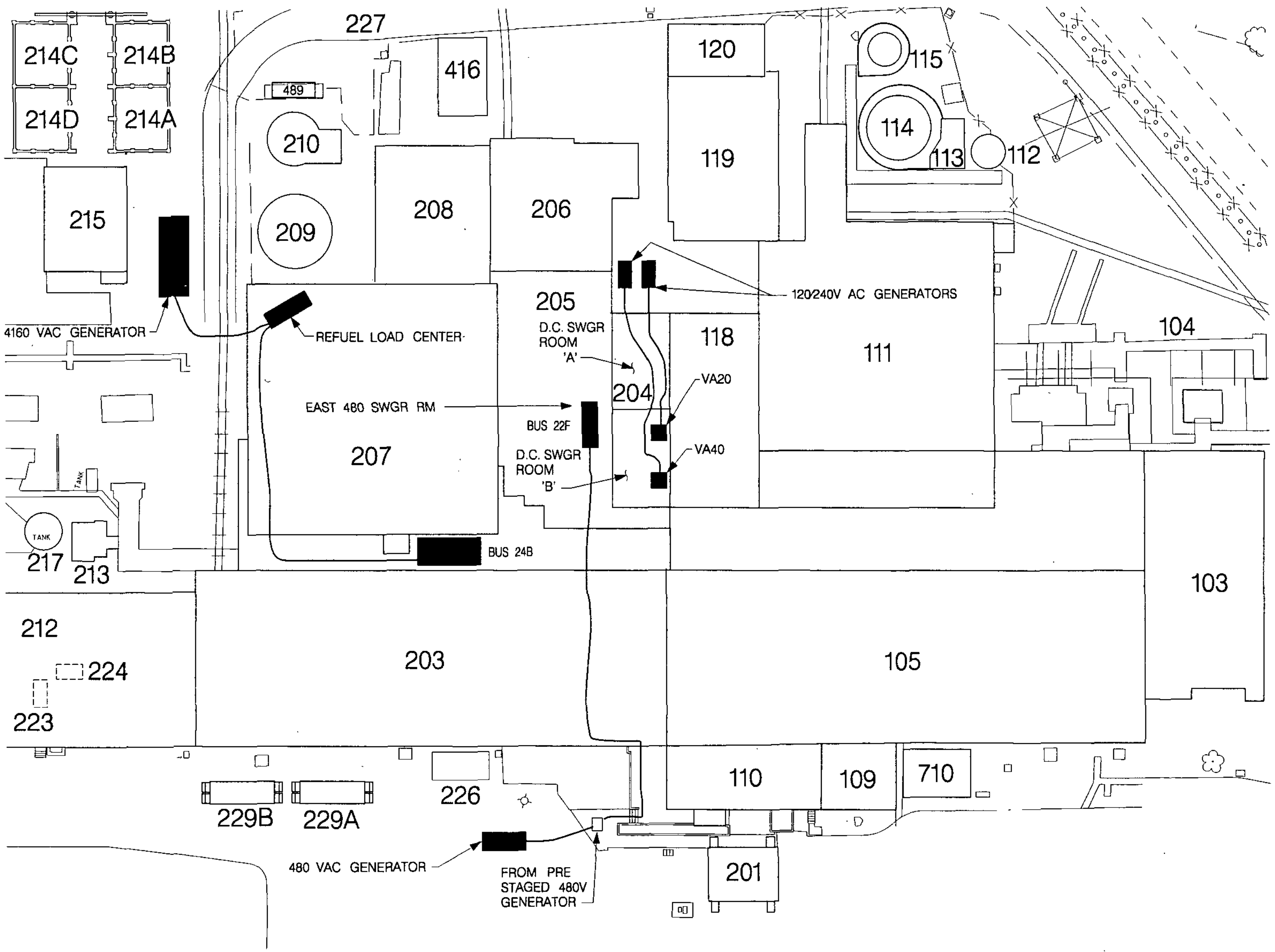

FIGURE 6
ELECTRICAL GENERATOR DEPLOYMENT
MILLSTONE UNIT 2

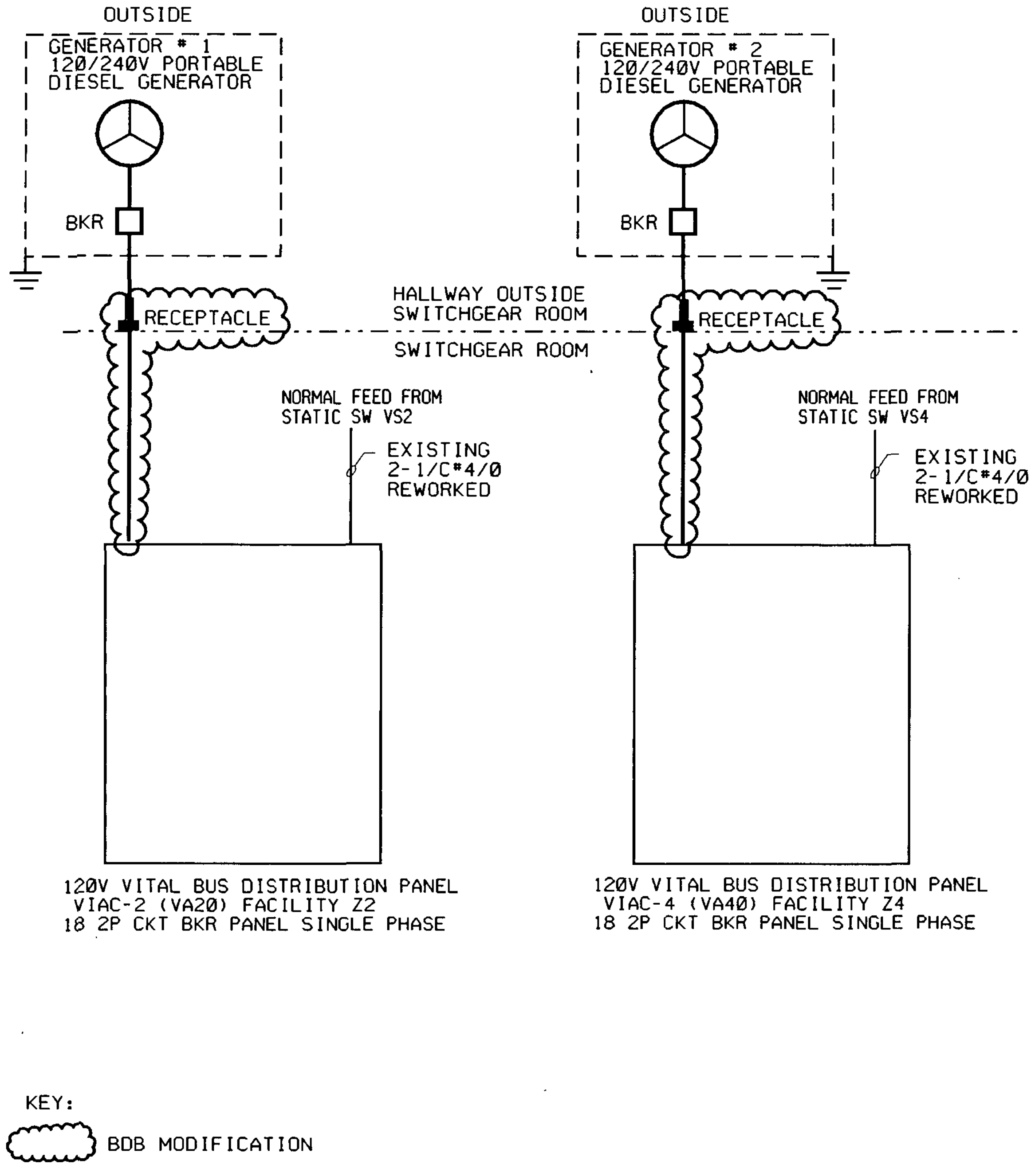

FIGURE 7
120/240 VAC GENERATOR
ELECTRICAL CONNECTIONS
MILLSTONE UNIT 2

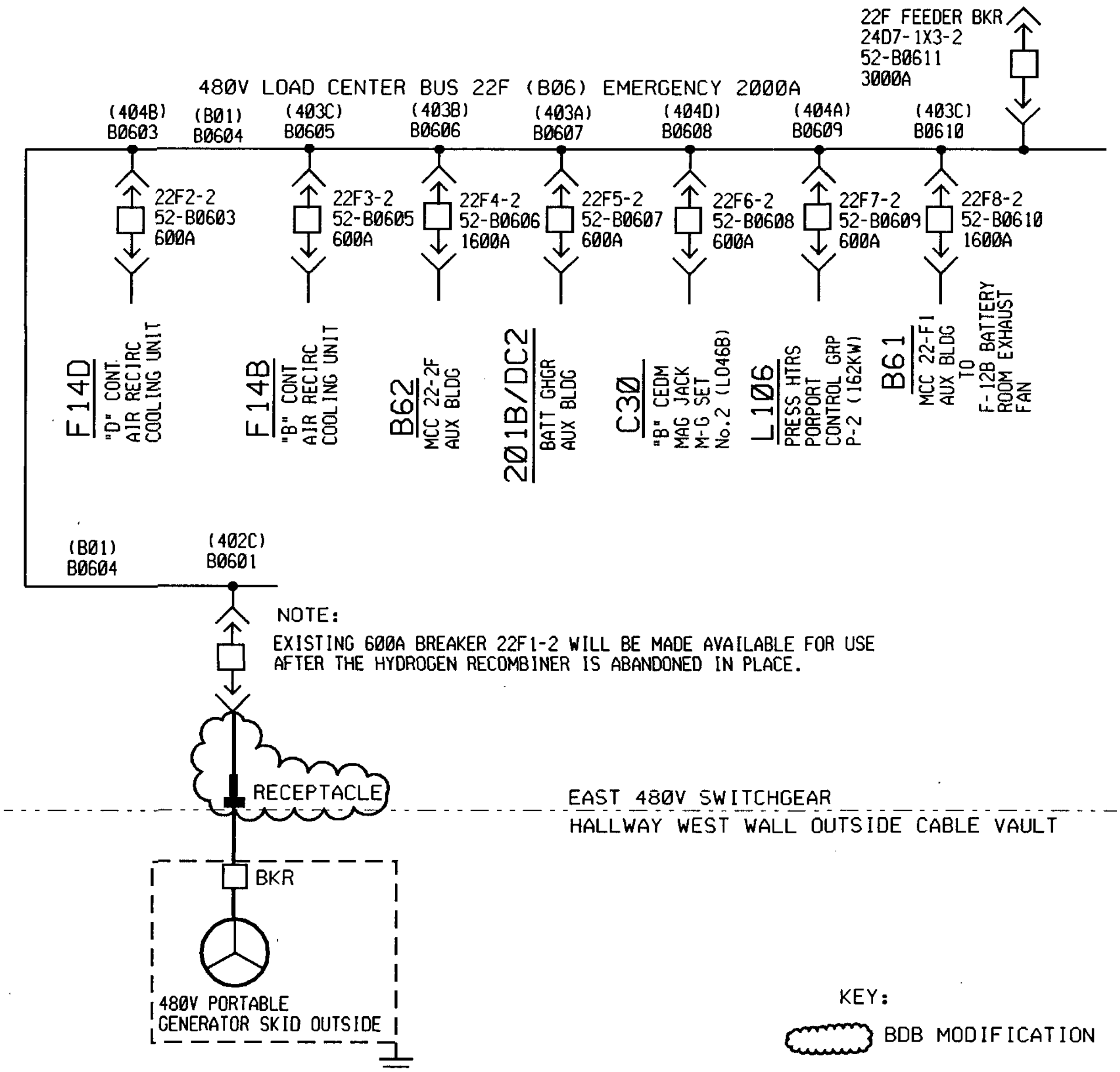

FIGURE 8
480 VAC GENERATOR
ELECTRICAL CONNECTIONS
MILLSTONE UNIT 2

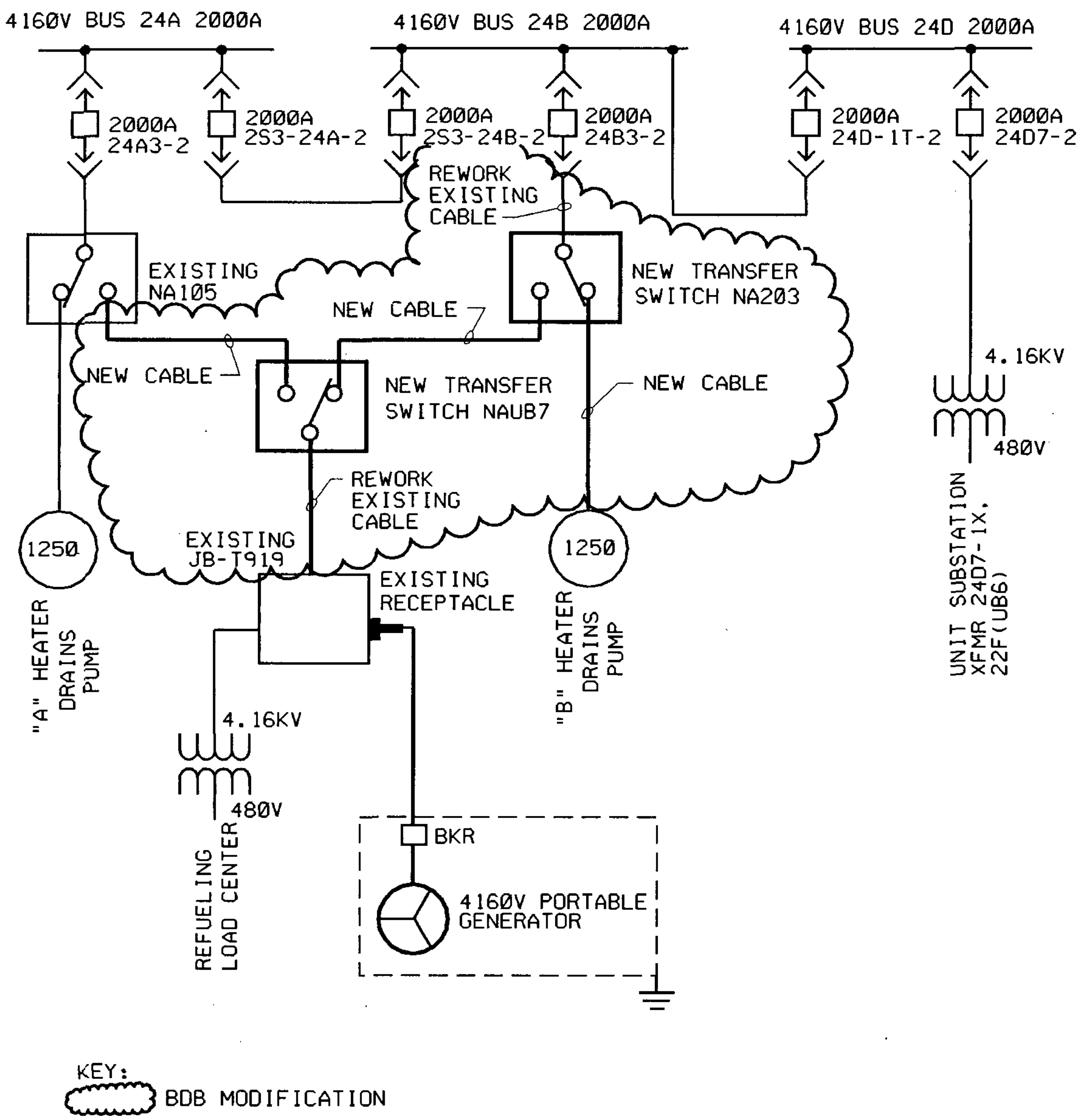

FIGURE 9
4160 VAC GENERATOR
ELECTRICAL CONNECTIONS
MILLSTONE UNIT 2

Enclosure 2

Millstone Unit 3 Overall Integrated Plan

Mitigation Strategies For Beyond-Design-Basis External Events

Millstone Power Station

Dominion Nuclear Connecticut, Inc.

Table of Contents

Table of Contents

List of Tables

List of Attachments

List of Attachments

LIST OF ACRONYMS

AC	Alternating Current
AFW	Auxiliary Feedwater
AOP	Abnormal Operating Procedure
AOT	Allowed Outage Times
AP	Abnormal Procedure
ASP	Auxiliary Shutdown Panel
ATWS	Anticipated Transient Without Scram
BDB	beyond-design-basis
CFR	Code of Federal Regulations
DC	Direct Current
DG	Diesel Generator
DWST	Demineralized Water Storage Tank
ECA	Emergency Contingency Action
ELAP	Extended Loss of AC Power
EOC	End of Cycle
EOP	Emergency Operating Procedure
EPRI	Electric Power Research Institute
ESF	Engineered Safety Features
FLEX	Diverse and Flexible Coping Strategies
FSAR	Final Safety Analysis Report
FSG	FLEX Support Guidelines
HELB	High Energy Line Break
INPO	Institute of Nuclear Power Operations
LOOP	Loss of Off-Site Power
LUHS	Loss of normal access to the Ultimate Heat Sink
MCR	Main Control Room
MPS	Millstone Power Station
MPS2	Millstone Power Station Unit 2
MPS2	Millstone Power Station Unit 3
MSL	Mean Sea Level
MSVB	Main Steam Valve Building
NEI	Nuclear Energy Institute
NOAA	National Oceanic and Atmospheric Administration
NR	Narrow Range
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
OBE	Operating Basis Earthquake
PA	Protected Area
PEICo	Pooled Equipment Inventory Company
PWROG	Pressurized Water Reactors Owners Group
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System

RRC	Regional Response Center
RVLIS	Reactor Vessel Level Indication System
RWST	Refueling Water Storage Tank
SAFER	Strategic Alliance for FLEX Emergency Response
SAT	Systematic Approach to Training
SBO	Station Blackout
SDM	Shutdown Margin
SFP	Spent Fuel Pool
SG	Steam Generator
SGBD	Steam Generator Blowdown
SSE	Safe Shutdown Earthquake
TDAFW	Turbine Driven Auxiliary Feedwater
TS	Technical Specification
UHS	Ultimate Heat Sink
VAC	Volts Alternating Current
VDC	Volts Direct Current
WR	Wide Range

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A. General Integrated Plan Elements	
A.1 - Determine Applicable Extreme External Hazard **Ref: NEI 12-06 section 4.0 - 9.0** **JLD-ISG-2012-01 section 1.0**	*Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps.* *Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant screened out for certain hazards.* The design basis of Millstone Power Station, Unit 3 (MPS3) provides protection against a broad range of external hazards. A site-specific assessment for MPS3 provides the development of strategies, equipment lists, storage requirements, and deployment procedures for the conditions and consequences of the following five classes of external hazards: • Seismic events • External flooding • Storms such as hurricanes, high winds, and tornadoes • Snow and ice storms, and cold • Extreme heat <u>Seismic Events</u> The MPS3 seismic hazard is considered to be the earthquake magnitude associated with the design basis seismic event. Per Final Safety Analysis Report (MPS3 FSAR) Section 2.5.2, the safe shutdown earthquake (SSE) produces a maximum horizontal ground acceleration of 0.17g. The operating basis earthquake (OBE) used in the plant design is based on ground motion having a maximum horizontal acceleration of 0.09g. For Diverse and Flexible Coping Strategy (FLEX), the earthquake is assumed to occur without warning and result in damage to non-seismically designed structures and equipment. Non-seismic structures and equipment may fail in a manner that would prevent accomplishment of FLEX-related activities (normal access to plant equipment, functionality of non-seismic plant equipment, deployment of beyond-design-basis (BDB) equipment, restoration of normal plant services, etc.) <u>External Flooding</u> Millstone Power Station (MPS) is located on the north shore of Long Island Sound. To the west of the site is Niantic Bay and to the East is Jordon Cove. The only sources of

	flooding that could affect MPS are direct rainfall and storm surge. There are no major rivers or streams in the vicinity of the station, nor are there any watercourses on the site. A number of small brooks flow into Jordan Cove, east of the site, and into the Niantic River and thence to Niantic Bay, west of the site. Any flooding of these brooks, even as a result of the probable maximum precipitation (PMP), would not significantly raise the water levels of any body of water in the vicinity of the site. Additionally, in each area, local topography precludes flooding of any portion of the site from the landward side. Since there are no major rivers or streams in the vicinity of the station, the effects of potential dam failures, seismically induced, are not applicable. The design basis flood levels for the MPS site comply with Regulatory Guide 1.59, Revision 2. Since MPS is located on a peninsula projecting into Long Island Sound, it is subjected to tidal flooding from severe storms. The highest such flooding has resulted from the passage of hurricanes. For a probable maximum hurricane, the maximum still water level was determined to be +19.7 feet MSL with an associated wave runup elevation of +23.8 feet MSL. Most safety-related equipment is protected from flooding since the site grade elevation is +24 feet MSL. The service water pumps and motors are located at elevation +14.5 feet MSL inside watertight cubicles of the pumphouse. The front wall of the intake structure extends to elevation +43 feet MSL and is designed to withstand the forces of a standing wave or clapotis with a crest elevation of +41.2 feet MSL. The effect of local intense precipitation has been evaluated for existing structures containing safety-related equipment. It was determined that the water accumulation from this precipitation would not have an adverse effect on safety-related equipment (MPS3 FSAR Section 2.4.1). The areas of the North American continent most susceptible to tsunamis are those bordering the Pacific Ocean and the Gulf of Mexico. MPS is located on the North Atlantic coastline where there is an extremely low probability of tsunamis (MPS3 FSAR Section 2.4.6). Therefore, tsunamis are not considered to be credible natural phenomena which might affect the safety of either unit at the MPS site. Flooding due to ice jams is not a possibility since the site is not on a river. Seiche-related flooding is not addressed in the MPS3 FSAR.

	Storms Such As Hurricanes, High Winds, and Tornadoes Plant design bases address the storm hazards of hurricanes, high winds and tornadoes. Strong winds, usually caused by intense low-pressure systems, tropical cyclones, or passages of strong winter frontal zones, occasionally affect the region. MPS is located on the north shore of the Long Island Sound. As such, it is exposed to tropical storms and hurricanes coming off the Atlantic Ocean. Storms of tropical origin occasionally affect the region during the summer and fall months. According to a statistical study by Simplon and Lawrence (1971), the 50-mile segment of coastline on which MPS is located, was crossed by five hurricanes during the 1886 to 1970 period. Based on observations from Montauk Point (located about 23 miles southeast of MPS on the eastern tip of Long Island), the maximum reported wind speed in the region was associated with the passage of a hurricane during which sustained winds of 115 mph, with short-term gusts up to 140 mph (Dunn and Miller 1960) were observed. For the period from 1961 through 1990, the "fastest-mile" wind speed recorded at Bridgeport was 74 mph occurring with a south wind in September 1985 (MPS3 FSAR Section 2.3.1.2). According to MPS3 FSAR Section 2.3.1.2.4, a study of tornado occurrences during the period of 1955 through 1967 (augmented by 1968-1981 storm data reports), the mean tornado frequency in the one-degree (latitude-longitude) square where the MPS site is located is determined to be approximately 0.704 per year. The design basis tornado for MPS3 was developed from Regulatory Guide 1.76. The tornado model used for design purposes at MPS3 has a 290 mph rotational velocity and a 70 mph translational velocity (MPS3 FSAR Section 2.3.2.3). Snow and Ice Storms, and Cold The climatology of the MPS site may be reasonably described by the data collected by the National Weather Service at Bridgeport, CT. Measurable snowfall has occurred in the months of November through April, although heavy snowfall occurrences are usually confined to the months of December through March. The mean annual snowfall at the present Bridgeport location is 25.3 inches, with totals since 1932 ranging from 8.2 inches in the 1972-1973 season, to 71.3 inches in the 1933-1934 season. The maximum monthly

	snowfall, occurring in February 1934, was 47.0 inches. Since 1949, both the maximum measured snowfall in 24 hours (16.7 inches), and the greatest snowfall in one storm (17.7 inches) occurred during the same storm in February 1969. The maximum measured snowfall in 24 hours (16.7 inches) was matched again in January 1978 (MPS3 FSAR Section 2.3.1). It is to be noted that according to the National Weather Service, the measured snowfall during the most recent winter storm of February 8-9, 2013 at Bridgeport location was 30 inches. Freezing rain and drizzle are occasionally observed during the months of December through March, and only rarely observed in November and April. An average of 18.5 hours of freezing rain and 8.5 hours of freezing drizzle occur annually in the region. In the 32-year period, 1949-1980, all cases of freezing precipitation were reported as light (less than 0.10 inch per hour), except for 1 hour of moderate (0.10 to 0.30 inch per hour) precipitation (MPS3 FSAR Section 2.3.1). Minimum daily temperatures during the winter months are usually below freezing, but subzero (deg F) readings are observed, on the average, less than one day every two years. Below zero temperatures have been observed in each winter month, with an extreme minimum of -20 deg F occurring in February 1934 National Oceanic and Atmospheric Administration (NOAA) 1971, 1990) (MPS3 FSAR Section 2.3.1). <u>Extreme Heat</u> Due to the proximity of Long Island Sound and the Atlantic Ocean, the heat of summer is moderated. Temperatures of 90 deg F or greater occur an average of seven days per year at Bridgeport, while temperatures of 100 deg F or greater have occurred only in July and August; with an extreme maximum of 104 deg F occurring in July 1957 (NOAA 1990) (MPS3 FSAR Section 2.3.1).
A.2 - Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • *Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and*

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	addressed on a schedule commensurate with other licensing bases changes. • *Exceptions for the site security plan or other (license/site specific) requirements of 10CFR may be required.* • *Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours.* • *Certain Technical Specifications cannot be complied with during FLEX implementation.* Key assumptions associated with implementation of FLEX Strategies: • Flood and seismic re-evaluations pursuant to Title 10 of the Code of Federal Regulations (10 CFR) 50.54(f) letter of March 12, 2012 are not completed and, therefore, not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule. commensurate with other licensing bases changes. • Exceptions for the site security plan or other (license/site specific) requirements of 10CFR may be required. • Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours. • This plan defines strategies capable of mitigating a simultaneous Extended Loss of AC Power (ELAP) and Loss of Normal Access to the Ultimate Heat Sink (LUHS) resulting from a BDB event by providing adequate capability to maintain or restore core cooling, containment, and Spent Fuel Pool (SFP)cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures (EOPs) in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications (TSs) contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the

	required actions to be taken when the limiting conditions are not met. The result of the Beyond Design Basis (BDB) event may place the plant in a condition where it cannot comply with certain TSs 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). This position is consistent with the previously documented 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). Boundary conditions are established to support development of FLEX strategies, as follows: • The BDB external event occurs impacting both units at the site. • The reactor is initially operating at power, unless there are procedural requirements to shut down due to the impending event. The reactor has been operating at 100% power for the past 100 days. • The reactor is successfully shut down when required (i.e., all rods insert, no Anticipated Transient Without Scram (ATWS). Steam release to maintain decay heat removal upon shutdown functions normally, and RCS overpressure protection valves respond normally, if required by plant conditions, and reseat. • On-site staff are at site administrative minimum shift staffing levels. • No independent, concurrent events, (e.g., no active security threat). • All personnel on-site are available to support site response. • The reactor and supporting plant equipment are either operating within normal ranges for pressure, temperature and water level, or available to operate, at the time of the event consistent with the design and licensing basis. The following plant initial conditions and assumptions are established for the purpose of defining FLEX strategies: • No specific initiating event is used. The initial condition is assumed to be a loss of off-site power (LOOP) with installed sources of emergency on-site alternating current (AC) power and station blackout

	(SBO) alternate AC power sources unavailable with no prospect for recovery. • Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, floods, and high winds and associated missiles are available. Permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, and high winds and associated missiles, are available. The fire protection system ring header is not relied upon as a water source since it is not considered to be robust with respect to seismic events. • Normal access to the ultimate heat sink is lost, but the water inventory in the UHS remains available and robust piping connecting the UHS to plant systems remains intact. The motive force for UHS flow, i.e., pumps, is assumed to be lost with no prospect for recovery. • Fuel for BDB equipment stored in structures with designs that are robust with respect to seismic events, floods and high winds and associated missiles, remains available. • Installed Class 1E electrical distribution systems, including inverters and battery chargers, remain available since they are protected with respect to seismic events, floods and high winds and associated missiles. • No additional accidents, events, or failures are assumed to occur immediately prior to or during the event, including security events. • Reactor coolant inventory loss consists of unidentified leakage at the Technical Specifications limit, reactor coolant letdown flow (until isolated), and reactor coolant pump (RCP) seal leak-off at normal maximum rate. • For the SFP, the heat load is assumed to be the maximum design basis heat load. In addition, inventory loss from sloshing during a seismic event does not preclude access to the pool area.

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A.3 - Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01 NEI 12-06 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* The MPS3 FLEX Program will fully implement the guidance of Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" and 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." There are no known deviations to the guidance.
A.4 - Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7 JLD-ISG-2012-01 section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walk through of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A.* *See attached sequence of events timeline (Attachment 1A).* *Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B).* The sequence of events timeline is provided in Attachment 1A. Preliminary estimates of response times have been developed based on plant simulator runs and table-top walkthroughs of planned actions. A 2 hour duration is assumed for deployment of equipment from the BDB Storage Building(s), based on a 'sunny day' validation for implementation of 10 CFR 50.54(hh)(2) time sensitive actions. The validation included deploying a portable high capacity pump from its storage location to a location near the Long Island Sound (staging location) and routing hoses to provide flow to the SFP. Time to clear debris to allow equipment deployment is assumed to be 2 hours, and will depend on the location of the BDB Storage Building(s). This time is considered to be reasonable based on site reviews and proposed locations of the BDB Storage Building(s). Debris removal equipment will be stored in the BDB Storage Building(s). Validation of estimated response times included in Attachment 1A will be completed once FSG procedures have been developed and will include a staffing analysis. **[Open Item 1]**

	The following items correspond to time constraint Action Items listed in Attachment 1A: <u>Action Item 7:</u> DC load stripping completed – 75 minutes Plant-specific analysis for extension of Class 1E battery life assumed that stripping of non-critical DC bus loads would be complete within 75 minutes of the occurrence of a loss of all AC power. With completion of load stripping in 75 minutes, the Class 1E battery life was initially calculated to be 5 hours. However, this battery life assumed that the 301A-1 and 301B-1 as well as 301A-2 and 301B-2 DC batteries were cross connected. Additional evaluations will be performed to determine battery life with load stripping without cross connecting the batteries since cross connecting requires a permanent plant modification **[Open Item 2]**. Within 45 minutes of the initiating event, an extended loss of AC power (ELAP) condition would be diagnosed and DC bus load stripping would be initiated. Load stripping is required to be completed within 30 minutes. The vital 120 Volts Alternating Current (VAC) panels and 125 VDC panels required to be accessed by the operator to perform load stripping are readily accessible based on the close proximity to the normal duty station for the operator assigned this action. Load stripping is an uncomplicated task requiring opening the distribution panel door and opening the specified breakers. Therefore, completing the load stripping action within 30 minutes is reasonable, and the 75 minute time constraint can be met. Load stripping is discussed further in Section F1.1. <u>Action Item 8:</u> Throttle AFW flow to SGs – 2 hours The procedure for SBO provides direction to start the turbine driven auxiliary feedwater (TDAFW) pump and close the RCS isolation valves. At MPS3, the TDAFW pump is aligned to supply water from the demineralized water storage tank (DWST) to the steam generators (SGs). Throttling of the AFW valves is needed to prevent overfilling of the SGs. Analysis shows that this action is required within 2 hours after the TDAFW pump starts. **[Open Item 3]** Therefore, throttling of AFW flow to the SGs within 2 hours is a time constraint. Operators would be assigned within the first 15 minutes of the event to control flow in order to maintain proper SG level. AFW flowrate

	can be controlled by locally throttling the AFW header isolation valves. Operators could reach the area in less than 5 minutes to begin to control AFW flow in order to maintain SG levels. Thus, SG level control could be accomplished in less than 2 hours. See Section B.1 for a discussion of AFW operation. Action Item 9: Repower 120V vital buses – 2 to 5 hours Prior to battery depletion, backup power must be provided for continued availability of essential instrumentation and controls powered from the 120 VAC vital buses. Portable diesel generators (DGs) will be utilized to provide backup power to selected 120 VAC vital buses associated with essential instrumentation circuits. The portable 120/240 VAC DGs will be deployed from the protected storage location to the staging location and pre-made cables will be connected to pre-installed BDB electrical receptacles near the staging location to provide required backup power. As an alternate backup power supply, a 480V DG will be pre-staged. A separate BDB electrical receptacle will be pre-installed, and pre-made cables will be available, to allow the 480V DG to provide required power to Class 1E 480 VAC buses. An evaluation of the Class 1E batteries will be performed to determine extended battery life. If insufficient time is available to implement the Phase 2 re-powering strategy, either modifications to increase battery life will be implemented or revisions to accelerate the re-powering strategy will be developed. **[Open Item 2]** See Section F1.2 for additional information related to repowering the 120 VAC vital buses. Action Item 12: Deploy BDB High Capacity pump to barge slip and initiate flow from Long Island Sound – 20.9 hours The DWST has sufficient volume to provide AFW for 20.9 hours **[Open Item 3]**, at which time a supplemental supply of AFW is required. The 20.9 hours is a time constraint to provide a supplemental AFW source. The credited supplemental source of AFW is water from Long Island Sound. To supply makeup to the DWST from the Long Island Sound, a BDB high capacity pump or a fire truck will be positioned at the barge slip pulling a draft off the sound. A temporary hose would be run to the DWST to provide a supplemental source of AFW. The clearing of debris between the BDB Storage Building(s) and the pump

	deployment location (barge slip), transfer of the pump, and running the temporary hose should take less than 3 hours. The fire truck or the BDB High capacity pump should have previously been placed in service as part of the Millstone Power Station, Unit 2 (MPS2) response. Therefore, providing a supplemental source of AFW will be accomplished within the time constraint of 20.9 hours. See Section B.2 for additional discussion. <u>Action Item 14:</u> Deploy BDB RCS Injection pump and initiate RCS injection for RCS inventory make-up /reactivity control – 25 hours An analysis of the current MPS3 RCS design determined that following a reactor trip and a loss of AC power, with no RCS makeup, the time of end of natural circulation flow and start of reflux cooling would be 33 hours (Reference ETE-NAF-2012-0150). Analysis of reactivity requirements determined that because of post trip xenon buildup and decay, for the limiting end of cycle case, assuming cooldown to the steam generator pressure of 290 psig, boration is not needed before 25 hours. A BDB RCS injection pump will be transported from an on-site BDB Storage Building(s) to the staging location. The BDB RCS injection pump will be deployed taking suction from the RWST and discharging into the RCS. Deployment of the pump is to start at 18 hours. Allowing 2 hours for transport and hose hookup to the connection points, flow into the RCS should start in about 20 hours. RCS inventory makeup is needed within 33 hours to ensure that sufficient RCS inventory is maintained and there is not a loss of natural circulation in the RCS. Initiating RCS injection for reactivity control at 20 hours will provide inventory makeup. See Section C for additional discussion. Initiation of water into the RCS at 20 hours provides significant margin to the time constraint of 25 hours for reactivity control. Since the RWST is not missile protected, a contingency plan has been developed if the RWST is not available as a source of borated water for RCS makeup. To provide a source of borated water, a portable tank that provides the ability to mix dry boric acid with water will be purchased as BDB equipment and stored onsite. This tank will be deployed

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	within 20 hours if the RWST is not available. The use of the tank is discussed in Section C. <u>Action Item 15:</u> Add Inventory to SFP – 50 hours Evaluations estimate that with no operator action following a loss of SFP cooling, the SFP will reach 212 deg F in approximately 10 hours and boil off to a level 10 feet above the top of fuel in approximately 50 hours from initiation of the event (Reference Calculation MISC-11792). To provide makeup to the SFP, a fire hose will be connected to the discharge of the BDB High Capacity pump or fire truck located at the barge slip. This pump discharge hose will tie into a water thief located outside the Fuel Building loading bay. (A "water thief" is a water distribution manifold used in the fire service to take an input from a large diameter hose, usually 5 inch or grater, and break it down into several smaller ones, each with independent control of water flow at the valve.) A hose to fill the SFP will run from the water thief to the new FLEX pipe connection. The FLEX pipe connection for the SFP will tie into an existing open-ended line which will discharge directly to the SFP. Alternate flowpaths include routing the BDB High Capacity pump directly over the edge of the SFP, or supplying portable spray nozzles. The BDB High Capacity pump has adequate capacity to provide SFP makeup flowrate requirements simultaneously with the flowrate requirements for AFW uses as described in Section B.2. Actions required within the Fuel Building to align the flowpath to the SFP can be accomplished prior to potential inaccessibility caused by pool water boiling, which is expected to be significantly later than the 10-hour calculated onset of boiling, based on the large volume of the Fuel Building and presence of significant heat sinks (large mass of concrete floors, walls, and ceiling, and fuel handling equipment). The BDB High Capacity pump (or fire truck) would have been deployed within 20.9 hours per Action Item 12 above. Routing the hose from the water thief to the new FLEX connection is a short duration task. Therefore, there is considerable margin to the required time constraint of 50 hours for this action. Refer to Section E for additional information related to providing makeup flow to the SFP.

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	Action Item 16: Reduce pressure and temperature in Containment - >7 days Conservative analysis concludes that containment temperature and pressure response will remain below design limits and that key parameter instrumentation subject to the containment environment will remain functional for at least seven days. Therefore, action to reduce containment pressure and temperature will not be required for a minimum of seven days following the ELAP event initiation. (Reference Calculation MISC-11793) Further analysis is required to determine the strategy and time requirements for actions beyond seven days to reduce containment pressure and temperature, if any. **[Open Item 4]** See Section D for additional information related to containment pressure and temperature following an ELAP/LUHS event.
A.5 - Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes* To ensure that the FLEX strategies can be deployed in all modes, areas adjacent to the equipment storage and equipment deployment locations on both units will be administratively controlled to maintain access for BDB use. Sufficient margins will be included in the hydraulic calculations to allow for hose routing around permanent plant equipment and temporary equipment staged in the Protected Area during maintenance activities, to both the primary and alternate connection points for each strategy. **[Open Item 5]** Mode-specific impacts on FLEX strategies are described below. Mode 1 Power Operations - this is the limiting condition for FLEX strategies and provides the basic assumptions for sizing and selection of equipment (e.g., >100 days of full power operation). Mode 2 Startup - operation in this mode occurs the least amount of time, with lower levels of decay heat than Mode 1. Mode 1 equipment design assumptions bound Mode 2

	impacts on FLEX strategies. No additional or modified strategies are necessary for this mode. Mode 3 Hot Standby - operation in this mode occurs for relatively short periods with lower levels of decay heat than Mode 1. Mode 1 equipment design assumptions bound Mode 3 impacts on FLEX strategies. No additional or modified strategies are necessary for this mode. Mode 4 Hot Shutdown - operation in this mode occurs for relatively short periods with lower levels of decay heat than Mode 1. Mode 1 equipment design assumptions bound Mode 4 impacts on FLEX strategies. No additional or modified strategies are necessary for this mode. Mode 5 Cold Shutdown – operation in this mode occurs for relatively short periods. Dominion will have provisions as required in NEI 12-06 Appendix D as follows: 1. Primary and alternate RCS injection connections will be installed, as described in Section C.2, that can provide feed and spill cooling capabilities 2. The connections will be designed for, and hydraulic analyses will be performed to confirm, makeup rates to support core cooling requirements (Approximately 260 gpm) **[Open Item 5]** 3. The BDB AFW pumps and associated equipment will be maintained available for deployment with makeup from the RWST to the primary or alternate RCS injection connections; and 4. Procedures will direct usage of the equipment as applicable. Mode 6 Refueling Shutdown/Refueling Operation - operation in this mode occurs for relatively short periods of time. As described for Cold Shutdown mode, the BDB AFW pumps will be available to add water from the RWST to the RCS via the primary or alternate RCS injection connections.

A.6 - Provide a milestone schedule. This schedule should include:
• **Modifications timeline**
  ○ **Phase 1 Modifications**
  ○ **Phase 2 Modifications**
	The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.
	
	• Modifications schedule.
	  ○ Phase 1: No modifications are anticipated.

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○ **Phase 3 Modifications** • **Procedure guidance development complete** ○ **Strategies** ○ **Maintenance** • **Storage plan (reasonable protection)** • **Staffing analysis completion** • **BDB equipment acquisition timeline** • **Training completion for the strategies** • **Regional Response Centers operational** **Ref: NEI 12-06 section 13.1**	○ Phase 2: Modifications will occur on the schedule shown on Attachment 2A. ○ Phase 3: Modifications will occur on the schedule shown on Attachment 2A. • Procedure guidance development for Strategies and Maintenance. ○ Strategies: Shown on Attachment 2A as "Issue FSGs and Associated Procedure Revisions" ○ Maintenance: Shown on Attachment 2A as "Create Maintenance Procedures" • Storage plan: Storage planning is included with the time segment identified as "Develop Modifications" on Attachment 2. Implementation is included with the time segment identified as"Implement Mods" on Attachment 2A. • Staffing Analysis: **[Open Item 1]** • FLEX equipment acquisition timeline: Shown on Attachment 2A as "Procure Equipment". • Training completion for the strategies: Shown on Attachment 2A as "Implement Training". • Regional Response Center (RRC) operational: Anticipated to occur by August 30, 2014.
A.7 - Identify how the programmatic controls will be met. **Ref: NEI 12-06 section 11 JLD-ISG-2012-01 section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section.* *See section 6.0 of JLD-ISG-2012-01.* 1) Quality Attributes Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control as outlined in this section. If the equipment is credited for other functions (e.g., fire protection), then the quality attributes of the other functions apply. 2) Equipment Design Design requirements and supporting analysis will be developed for portable equipment that directly performs a FLEX mitigation strategy for core cooling, RCS

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	inventory, containment function, and SFP cooling. The design requirements and supporting analysis provide the inputs, assumptions, and documented analysis that the mitigation strategy and support equipment will perform as intended. Manufacturer's information is used in establishing the basis for the equipment use. The specified portable equipment capacities ensure that the strategy can be effective over a range of plant and environmental conditions. This design documentation will be auditable, consistent with generally accepted engineering principles and practices, and controlled within Dominion's document management system. The basis for designed flow requirements considers the following factors: a) Pump design output performance (flow/pressure) characteristics. b) Line losses due to hose size, coupling size, hose length, and existing piping systems. c) Head losses due to elevation changes, especially for spray strategies. d) Back pressure when injecting into closed/pressurized spaces (e.g., RCS, containment, SGs). e) Capacity, temperature, boron concentration, water quality (suspended solids content, etc.) and availability of the suction sources given the specific external initiating events (DWST)/ (RWST)/fire main/Long Island Sound, etc.) to provide an adequate supply for the BDB pumps (fire engines, portable pumps, fire protection system pumps, etc.). f) Potential detrimental impact on water supply source or output pressure when using the same source or permanently installed pump(s) for makeup for multiple simultaneous strategies. g) Availability of sufficient supply of fuel on-site to operate diesel powered pumps and generators for the required period of time. h) Potential clogging of strainers, pumps, valves or hoses from debris or ice when using rivers, lakes, or ocean as a water supply. i) Environmental conditions (e.g., extreme high and low temperature range) in which the equipment would be expected to operate. 3) Storage of Equipment - a study is in progress to determine the design features, site location(s), and number of BDB Storage Building(s). The final design

	for the BDB Storage Building(s) will be based on the guidance contained in NEI 12-06, Section 11.3, Equipment Storage. A supplement to this submittal will be provided with the results of the equipment storage study. **[Open Item 6]** 4) Procedure Guidance **[Open Item 7]** a) FSGs will be developed in accordance with Pressurized Water Reactors Owners Group (PWROG) guidelines. b) Interface with EOPs EOP ECA0.0, "Loss of All AC Power" will be revised to the extent necessary to include appropriate reference to FSGs. c) Interface with Abnormal Operating Procedures (AOPs) The AOPs listed below will be revised to the extent necessary to include appropriate reference to FSGs. AOP 3569, "Severe Weather Conditions" AOP 3570, "Earthquake" EOP 3505A, "Loss of Spent Fuel Pool Cooling" d) FSG Maintenance Process FSG maintenance will be performed using the administrative process for procedure control. e) Regulatory Screening/Evaluation NEI 96-07, Revision 1, and NEI 97-04, Revision 1 will be used to evaluate the changes to existing procedures as well as to the FSG to determine the need for prior NRC approval. Changes to procedures that perform actions in response events that exceed a site's design basis should, per the guidance and examples provided in NEI 96-07, Rev. 1, screen out. Therefore, procedure steps which recognize the BDB ELAP/LUHS has occurred and which direct actions to ensure core cooling, SFP cooling, or containment integrity should not require prior NRC approval. 5) Maintenance and Testing **[Open Item 8]** a) Periodic testing and preventative maintenance of the BDB equipment will follow guidance provided in Institute of Nuclear Power Operations (INPO) AP-913. The testing and maintenance recommendations will be developed by Electric Power Research Institute (EPRI) and these EPRI guidance documents will be used to develop testing frequencies and maintenance schedules.

	b) The unavailability of equipment and applicable connections that directly performs a FLEX mitigation strategy for core, containment, and SFP will be managed such that risk to mitigating strategy capability is minimized. Maintenance / risk guidance will be developed as follows: i) Portable BDB equipment may be unavailable for 90 days provided that the site FLEX capability (N) is available. ii) If portable equipment becomes unavailable such that the site FLEX capability (N) is not maintained, initiate actions within 24 hours to restore the site FLEX capability (N) and implement compensatory measures (e.g., use of alternate suitable equipment or supplemental personnel) within 72 hours iii) Work Management procedures will be revised to reflect AOT (Allowed Outage Times) as outlined above. 6) Training (See section A.8) 7) Staffing A review of FLEX response strategies and minimum on-site staffing will be performed to validate staffing needs. **[Open Item 1]** 8) Configuration Control **[Open Item 9]** a) The FLEX strategies and their bases will be maintained in an overall program document. The program will address the key safety functions to: i) Provide reactor core cooling and heat removal, ii) Provide RCS inventory and reactivity control, iii) Ensure containment integrity, iv) Provide SFP cooling, v) Provide indication of key parameters, and vi) Provide reactor core cooling (Modes 5 and 6). b) In addition to the key safety functions listed above, support functions have been identified that provide support for the implementation of the FLEX strategies. Those support functions include: i) Providing load stripping of 125 VDC and 120 VAC vital buses to extend battery life, ii) Re-powering AC and DC electrical buses, iii) Providing ventilation for equipment cooling and area habitability, iv) Providing lighting,

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	v) Providing communications capability, vi) Providing for fueling of portable equipment, and vii) Providing plant and area access. c) The program document will also contain a historical record of previous strategies and their bases. The program document will include bases for ongoing maintenance and testing activities for the BDB equipment d) Existing design control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies. Changes for the FLEX strategies will be reviewed with respect to operations critical documents to ensure no adverse effect. e) Future changes to the FLEX strategies may be made without prior NRC approval provided: i) The revised FLEX strategies meet the requirements of NEI 12-06. ii) An engineering basis is documented that ensures that the change in FLEX strategies continues to ensure the key safety functions (core and SFP cooling, containment integrity) are met.
A.8 - Describe training plan	*List training plans for affected organizations or describe the plan for training development* Dominion's Nuclear Training Program will be revised to assure personnel proficiency in the mitigation of BDB events is developed and maintained. These programs and controls will be developed and implemented in accordance with the Systematic Approach to Training (SAT). **[Open Item 10]** Initial and periodic training will be provided to site emergency response leaders on BDB emergency response strategies and implementing guidelines. Personnel assigned to direct the execution of mitigation strategies for BDB events will receive necessary training to ensure familiarity with the associated tasks, considering available job aids, instructions, and mitigating strategy time constraints. Operator training for BDB event accident mitigation will not be given undue weight in comparison with other training requirements. The testing/evaluation of Operator knowledge and skills in this area will be similarly weighted. Operator training will include use of equipment from the

	RRC. "ANSI/ANS 3.5, Nuclear Power Plant Simulators for use in Operator Training" certification of simulator fidelity (if used) is considered to be sufficient for the initial stages of the BDB external event scenario until the current capability of the simulator model is exceeded. Full scope simulator models will not be upgraded to accommodate FLEX training or drills. Where appropriate, integrated FLEX drills will be organized on a team or crew basis and conducted periodically; with all time-sensitive actions to be evaluated over a period of not more than eight years. It is not required to connect/operate permanently installed equipment during these drills.
A.9 - Describe Regional Response Center plan	The industry will establish two (2) RRCs to support utilities during BDB events. Dominion has established contracts with the Pooled Equipment Inventory Company (PEICo) to participate in the process for support of the RRCs as required. Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. In addition, on-site BDB equipment hose and cable end fittings are standardized with the equipment supplied from the RRC. 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 the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.

Notes:

The information provided in this section is based on the following reference(s):

- Millstone Power Station, Unit 3, Final Safety Analysis Report, Revision 24.
- Engineering Technical Evaluation, ETE -CEE-2012-1001, "Millstone Beyond Design Basis DC Load Shedding Strategy and Analysis for Extended SBO Event."
- Engineering Technical Evaluation, ETE -NAF-2012-0150, "Evaluation of Core Cooling Coping for Extended Loss of AC Power (ELAP) and Proposed Input for Dominion's Response to NRC Order EA-12-049 for Dominion Fleet" Revision 1, January 10, 2013.

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- Calculation MISC-11792, "Extended Loss of AC Power, Spent fuel Pool Heatup times and Water Makeup for Dominion Nuclear", Revision 0.
- Calculation MISC-11793, "Evaluation of Long Term Containment Pressure and Temperature Profiles Following Loss of Extended AC Power (ELAP)", Revision 0.
- Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis -FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

B. Maintain Core Cooling & Heat Removal

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

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

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

B.1 - PWR Installed Equipment Phase 1

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

Following the occurrence of an ELAP/LUHS event, the reactor will trip and the plant will initially stabilize at no-load RCS temperature and pressure conditions, with reactor decay heat removal via steam release to the atmosphere through the SG safety valves and/or atmospheric relief valves. Natural circulation of the RCS will develop to provide core cooling and the steam turbine driven auxiliary feedwater pump will provide flow from the DWST to the SGs to make-up for steam release.

Operators will respond to the event in accordance with EOPs to confirm RCS, secondary system, and containment conditions. A transition to EOP 35 ECA-0.0, Loss of All AC Power, will be made upon the diagnosis of the total loss of AC power. This procedure directs isolation of RCS letdown pathways, confirmation of natural circulation cooling, verification of containment isolation, reducing DC loads on the station batteries, and establishment of electrical equipment alignment in preparation for eventual power restoration. The operators control AFW flow to the SGs, establish manual control of the SG atmospheric relief bypass valves, and initiate a rapid cooldown of the RCS to minimize inventory loss through the RCP seals. ECA-0.0 will be revised to direct local manual control of auxiliary feedwater flow to the steam generators and local manual control of the SG atmospheric relief bypass valves to control the RCS cooldown rate, as necessary **[Open Item 7]**.

Core Cooling and Heat Removal Phase 1 Strategy

The Phase 1 strategy for reactor core cooling and heat removal relies upon installed plant equipment and water sources for AFW supply to the SGs and steam release to the atmosphere.

The TDAFW pump automatically starts on two or more SGs low water level condition and does not require AC or DC electrical power to provide AFW flow to the SGs. If the TDAFW pump

[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.

fails to start or trips, operators manually reset and start the pump locally. Sufficient time (approximately 50 minutes) will be available to start the pump prior to SG dry-out conditions **[Open Item 3]**. The AFW system is pre-aligned for flow to the SGs from the TDAFW pump. Local manual control of AFW flowrate to the SGs is required within approximately 2 hours to prevent overfill **[Open Item 3]**. AFW flowrate can be controlled by locally throttling the AFW header isolation valves.

Steam release from the SGs will be controlled locally within the MSVB using the handwheels installed on the motor-operated SG atmospheric relief bypass valves. The steam vent piping sections above the MSVB roof are not fully protected from tornado generated missiles. However, consistent with the plant design basis, the diversity of available pathways (8) ensures the ability to relieve steam to the atmosphere to support the FLEX strategy for depressurization and cooldown. In accordance with the existing procedure for response to loss of all AC power, a RCS cooldown will be initiated at a maximum rate of 100F/hr to a SG pressure of 290 psig minimum. The rapid RCS cooldown minimizes adverse effects of high temperature coolant on RCP shaft seal performance and reduces SG pressure to allow for eventual feedwater injection from a portable pump in the event that the TDAFW pump is not available. The minimum SG pressure is established to prevent safety injection accumulator nitrogen gas from entering the RCS.

Initially, AFW water supply will be provided by the installed DWST. The tank has a minimum usable capacity of 312,800 gallons and will provide a suction source to the TDAFW pump for a minimum of 20.9 hours **[Open Item 3]**.

Vital AC and DC bus load stripping is implemented to preserve battery life as described in Section F1.1. Selected vital AC circuits remain energized following load stripping to provide power to necessary instrumentation, in order to provide the key reactor parameter information, as indicated in Section B.1.3.

The equipment relied upon to provide reactor core cooling and heat removal for the Phase 1 strategy are protected against the applicable external hazards described in Section A.1.

Details:	
B.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* The existing emergency procedure for the response to the loss of all AC power provides the necessary guidance to accomplish the Phase 1 strategy for core cooling and heat removal.
B.1.2 - Identify modifications	*List modifications and describe how they support coping time.* None required.
B.1.3 - Key Reactor Parameters	*List instrumentation credited for this coping evaluation phase.* Instrumentation providing the following key parameters is credited

	for Phase 1: AFW Flowrate: Indication of AFW flowrate to each SG is available in the main control room (MCR) and on the auxiliary shutdown panel (ASP). AFW flowrate indication for all SGs is available throughout the event. SG Water Level: SG wide range (WR) and narrow range (NR) water level indication is available for all SGs from the MCR and the ASP throughout the event. SG Pressure: SG pressure indication is available for all SGs from the MCR and the ASP throughout the event. RCS Temperature: RCS hot-leg temperature indication is available from the MCR and the ASP throughout the event. RCS cold-leg temperature can be inferred from SG pressure. Core Exit Thermocouple indications are available throughout the event at the Inadequate Core Cooling (ICC) cabinets located adjacent to the MCR. DWST Level: DWST water level indication is available from the MCR and locally at the tank throughout the event.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE-CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

B. Maintain Core Cooling & Heat Removal

B.2 - PWR Portable Equipment Phase 2

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

As described in Section B.1, Phase 1 coping following an ELAP/LUHS will be accomplished using the installed TDAFW pump to feed the SGs, the SG atmospheric relief bypass valves for SG steam release to control RCS temperature and effect a RCS cooldown, and the DWST to provide the AFW water source to the TDAFW pump. The Phase 1 coping strategy provides sufficient AFW water inventory for reactor core cooling and decay heat removal for a minimum of 20.9 hours and is sufficient to stabilize the plant at 290 psig SG pressure, which will result in RCS cold leg temperature of approximately 418 deg F with pressure greater than SI accumulator nitrogen injection pressure **[Open Item 3]**.

Core Cooling and Heat Removal Phase 2 Strategy

The Phase 2 strategy for reactor core cooling and heat removal provides indefinite supply of water for feeding SGs and a portable, diesel driven backup BDB AFW pump for use in the event that the TDAFW pump becomes unavailable. Initial evaluations indicate that the TDAFW pump will operate long-term until reactor decay heat is reduced to a point where adequate SG steam pressure and flow cannot be provided to the turbine inlet to support pump operation (120 psia at turbine inlet per MPS3 FSAR Section 10.4.9.2). **[Open Item 11]** The strategy includes repowering of vital 120 VAC buses to maintain availability of key parameters monitoring instrumentation. Phase 2 electrical bus repowering strategies are described in Section F.1.2.

a. <u>Indefinite Supply of Water for SG Injection</u>
MPS site has multiple fresh water supplies which will be deployed to add water to the DWST or provide a suction directly to the BDB AFW pump. These include the 3,000,000 gallon site pond which can provide core cooling supply for greater than 20 days to each unit **[Open Item 3]**. The Long Island Sound will only be used as a last resort. If needed as an indefinite water source, the Long Island Sound will remain available for any of the external hazards listed in Section A.1. Refer to Figure 2 for a diagram of the flowpath and equipment utilized to facilitate this water supply. The portable, diesel driven BDB High Capacity pump (Table 1) will be transported from the BDB Storage Building(s) to a location near the water source. A flexible hose will be routed from the pump suction to the water source where water will be drawn through a strainer limit solid debris size to prevent damage to the TDAFW or BDB AFW pump. A flexible hose will be routed from the fire truck or the BDB High Capacity pump discharge to the BDB DWST suction/fill connection or to the suction of the portable BDB AFW pump via a distribution manifold that also provides water to the SFP as described in Section E.2 and the RCS as described in Section C.2. The BDB High Capacity pump will be sized to provide 300 gpm AFW water supply and 250 gpm make-up to the SFP to both MPS Unit 2 and 3 simultaneously.

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B. Maintain Core Cooling & Heat Removal

B.2 - PWR Portable Equipment Phase 2

As indicated in the sequence of events discussed in Section A.4, the back-up supply of SG injection water is made available prior to the loss of suction source to the TDAFW pump, which occurs no sooner than 20.9 hours after the ELAP/LUHS initiation **[Open Item 3]**. Hydraulic analysis of the flowpath from the Long Island Sound to the DWST and to the BDB AFW pump suction will be performed to confirm that applicable performance requirements are met. **[Open Item 5]**

b. Back-up SG Water Injection

Consistent with NEI 12-06, Appendix D, backup SG water injection capability will be provided using a portable AFW pump through a primary and alternate connection. The portable, diesel-driven BDB AFW pump (Table 1) will provide a back-up SG injection method in the event that the TDAFW pump can no longer perform its function due to low SG pressure. Hydraulic analyses will be performed to confirm that the BDB AFW pump is sized to provide the minimum required SG injection flowrate to support reactor core cooling and decay heat removal. **[Open Item 5]**

The BDB AFW pump will be transported from the BDB Storage Building(s) to a location near the system connection established for discharge to the SG (described below). A flexible hose will be routed from the pump suction to align either the BDB DWST suction/fill connection or the discharge of the fire truck or the BDB High Capacity pump (Figure 2). The BDB AFW pump discharge can be aligned to either a primary or alternate pump discharge connection for SG injection.

b.i Primary AFW Pump Discharge Connection

The primary AFW pump discharge connection for SG injection will be located on the TDAFW pump discharge header in the TDAFW pump cubicle located in the Engineered Safety Features (ESF) Building (Figure 3). A flexible hose will be routed from the BDB AFW pump discharge to the primary connection through the ESF Building. The ESF Building is a seismic category I, tornado missile protected structure and the primary AFW pump discharge connection will be available for all hazards listed in Section A.1. Hydraulic analysis of the flowpath from the BDB DWST suction/fill connection to the primary AFW pump discharge connection will be performed to confirm that applicable performance requirements are met. **[Open Item 5]**

b.ii Alternate AFW Pump Discharge Connection

In the event that the primary AFW pump discharge connection is not available, an alternate connection will be provided. The alternate AFW pump discharge connection for SG injection will be located in the steam generator blowdown (SGBD) system at the 56 ft Elevation of the MSVB, which is separate from the TDAFW pump cubicle. The connection consists of a hose adapter that replaces the valve bonnet on one of four manual isolation valves for a SGBD flow control valve (Figure 3). The use of this connection provides flow to all SGs and will require blocking open two air-operated control valves and throttling flowrate using a manual valve in each of the SGBD lines. A flexible hose is routed from the BDB AFW pump discharge to the alternate connection hose adapter through the MSVB. This alternate connection is located inside the seismic category I,

B. Maintain Core Cooling & Heat Removal	
B.2 - PWR Portable Equipment Phase 2	
tornado missile protected MSVB. Portions of the SGBD piping are not seismically-designed and some piping enters the Turbine Building, therefore, this connection may not be available following a seismic or tornado event. The alternate connection is protected against the other external hazards listed in Section A.1 and provides diversity from the primary connection which is protected against all hazards listed in Section A.1. Hydraulic analysis of the flowpath from the BDB DWST suction/fill connection to the alternate AFW pump discharge connection will be performed to confirm that applicable performance requirements are met. **[Open Item 5]**	
Details:	
B.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing the core cooling and heat removal strategies will be developed using industry guidance, and will address the necessary steps to deploy portable pumps and hoses, establish connections, and operate the portable equipment to perform the required function. **[Open Item 7]**
B.2.2 - Identify modifications	*List modifications necessary for phase 2* (1) Install the BDB DWST suction/fill connection.**[Open Item 12]** (2) Install BDB AFW pump discharge primary connection located on the TDAFW pump discharge header in the TDAFW pump cubicle. **[Open Item 12]**
B.2.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 2 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section B.1.3 for Phase 1. Portable BDB equipment will include local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP/LUHS.

B. Maintain Core Cooling & Heat Removal	
B.2 - PWR Portable Equipment Phase 2	
B.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

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B. Maintain Core Cooling & Heat Removal

B.2 - PWR Portable Equipment Phase 2

B.2.5 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
Identify Strategy including how the equipment will be deployed to the point of use. <u>a. Indefinite Supply of Water for SG Injection</u> The fire truck or the BDB High Capacity pump will be deployed to transfer water from Long Island Sound to fill the DWST or directly provide the suction for the BDB AFW pump. Figure 1 identifies the deployed location of BDB equipment and routing of hoses, relative to plant structures and other features, necessary to implement this strategy. The BDB High Capacity pump is a trailer-mounted, diesel driven centrifugal pump that will be stored in the BDB Storage Building(s). The pump will be deployed by towing the trailer to a designated location near the barge slip, which is adjacent to Long Island Sound shoreline. One end of the flexible suction hose, equipped with a strainer, will be lowered to below the water surface, and	*Identify modifications* BDB DWST suction/fill connection - modification required to permanently install this connection. **[Open Item 12]** The BDB DWST suction/fill connection consists of a piping tee fitting installed in the TDAFW pump suction line. The connection will be located in the TDAFW pump cubicle within the ESF Building. The connection will be a hose quick-connect fitting and includes an isolation valve.	*Identify how the connection is protected* The BDB DWST suction/fill connection will be located within the seismic category I, tornado missile protected ESF Building. The connection is protected from the external hazards described in Section A.1.

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B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
the other end will be attached to the pump suction via quick-connect hose connection. A flexible hose will be routed from the pump discharge quick-connect hose fitting to a distribution manifold. From this manifold, a hose will be routed to the BDB DWST suction/fill connection (modification required to permanently install this connection) located in the TDAFW pump cubicle. The pump discharge hose will be routed along the ground and access to the BDB DWST suction/fill connection is through the ESF Building. As indicated in the sequence of events discussed in Section A.4, the back-up supply of SG injection water will be made available prior to the loss of suction source to the TDAFW pump, which occurs no sooner than 20.9 hours after the ELAP/LUHS initiation **[Open Item 3]**.		
b. <u>Back-up SG Water Injection</u> The BDB AFW pump will be deployed to provide an alternate source of SG injection capability in the event that the TDAFW pump cannot perform its function due to low steam generator pressures. Figure 1 identifies the deployed location	Primary AFW pump discharge BDB connection - modification required to permanently install this connection. **[Open Item 12]** The primary AFW pump discharge BDB connection consists of a piping tee fitting installed in the TDAFW pump	The primary AFW pump discharge BDB connection will be located within the seismic category I, tornado missile protected ESF Building. The connection will be protected from the external hazards described in Section A.1. The alternate AFW pump

B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
of BDB equipment and routing of hoses, relative to plant structures and other features, necessary to implement this strategy. The BDB AFW pump is a trailer-mounted, diesel driven centrifugal pump that will be stored in the BDB Storage Building(s). The pump will be deployed by towing the trailer to a designated location near the ESF Building. An appropriate length of hose equipped with quick-connect hose fittings will be routed between the BDB DWST suction/fill connection (described in Section B.2.5.a) and the pump suction connection. Alternatively, the hose may be aligned directly to the fire truck or the BDB High Capacity pump discharge rather than the DWST suction/fill connection. Hose routing will be along the ground. For discharge to the primary AFW pump discharge BDB connection described in Section B.2.b.i, a suitable length of high pressure flexible hose will be routed from the BDB AFW pump to the primary connection within the ESF Building. The hose will be attached to the BDB AFW pump discharge nozzle via quick-connect hose fitting. The other end of the	discharge header branch line located inside the TDAFW pump cubicle in the ESF Building. The connection will be a quick-connect hose fitting and includes an isolation valve.	discharge BDB connection will be located within the seismic category I, missile protected MSVB. The SGBD piping is not seismically-designed; therefore, this connection may not be available following a seismic event. The connection will be protected from the other external hazards described in Section A.1.

B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
hose will be attached to the hose quick-connect fitting at the AFW pump discharge BDB connection (modification required to permanently install this connection). Water from the DWST, or from the discharge of the fire truck or the BDB High Capacity pump, can be pumped to the SGs via the AFW pump discharge BDB connection through the AFW system piping. For discharge to the alternate AFW pump discharge BDB connection described in Section B.2.b.ii, a suitable length of high pressure flexible hose will be routed from the BDB AFW pump discharge to the 56 feet elevation of the MSVB. The hose will be connected to the SGBD line by disassembling a SGBD control valve isolation valve to remove the valve bonnet and install a pre-fabricated flanged hose adapter assembly. The two air-operated control valves in the line between the connection and the SG are blocked open to allow AFW flow to the SG. Water from the DWST, or from the discharge of the fire truck or the BDB High Capacity pump, can be pumped by the BDB AFW pump to the SGs via reverse flow in the SGBD		

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B. Maintain Core Cooling & Heat Removal		
B.2 - PWR Portable Equipment Phase 2		
system piping as described in Section B.2.b.ii.		

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

Millstone Power Station, Unit 3, Final Safety Analysis Report, Revision 24.

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B. Maintain Core Cooling & Heat Removal	
B.3 - PWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods and strategy(ies) utilized to achieve this coping time. Additional pumps will be provided from the RRC to provide backup to the BDB AFW pumps as well as the BDB High Capacity pumps. The installed TDAFW pump has the capability to operate for an extended period of time. Failure of the pump can be mitigated by the on-site BDB AFW pump. The RRC pumps provide backup capability should multiple failures occur during extended operation after several days or weeks from the event.	
Details:	
B.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* See Section B.2.1.
B.3.2 - Identify modifications	*List modifications necessary for phase 3* None
B.3.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 3 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section B.1.3 for Phase 1. Portable BDB equipment from the RRC will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP/LUHS.

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B. Maintain Core Cooling & Heat Removal		
B.3 - PWR Portable Equipment Phase 3		
B.3.4 - Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Phase 3 equipment will be provided by the RRC. Equipment transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored at the designated lay down area until moved to the point of use area. Pre-determined deployment paths will be used to move equipment as necessary.	*Identify modifications* No modifications have been identified to support Phase 3 deployment activities.	*Identify how the connection is protected* See Section B.2.5.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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C. 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**

C.1 - PWR Installed Equipment Phase 1:

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

With an ELAP and a LUHS the plant staff will implement a strategy for maintaining RCS inventory during plant stabilization and subsequent RCS cooldown activities. RCS inventory is preserved by isolating or verifying isolated potential RCS letdown paths. (RCS letdown isolation valves, pressurizer PORVs, reactor vent valves, and RCP seal water return valve.)

In general, the FLEX strategy for RCS inventory control / reactivity management relies on RCP seal leakage being sufficiently low for initial control of RCS inventory for the first 20 hours of an ELAP / LUHS event. Then before loss of natural circulation or core uncovery, stage a portable diesel driven high pressure / low capacity injection pump for delivery of RCS makeup and core reactivity management, as required, from a borated suction source for the duration of the ELAP / LUHS event.

The MPS3 RCS responses were evaluated. RCP seal leakage was assumed to occur within approximately 10 minutes of the total loss of AC power.

Upon identification of a loss of AC power, operators will enter the procedure for loss of all AC power. This procedure will direct a cooldown and depressurization of the RCS using the steam generator (SG) atmospheric relief bypass valves. Based on an engineering evaluation, which assumes infinite Auxiliary Feedwater (AFW) supply to the SGs and the ability to monitor SG level, the RCS volume will not decrease below the top of the active fuel until approximately 55 hours into the transient, however using the criteria of avoidance of reflux boiling, RCS makeup is required for MPS3 by approximately 33 hours.

[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.

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C. Maintain RCS Inventory Control

The procedure for loss of all AC power provides direction for the Operator to initiate an RCS cooldown using the SG atmospheric relief bypass valves to a steam generator pressure of approx 290 psig which equates to an RCS core inlet temperature of approximately 418 deg F.

Reactivity evaluations for the most limiting core conditions indicate that for cooldown and depressurization to the current target SG pressure of 290 psig, no boration is required within the first 25 hours to maintain Keff <0.99. The most limiting core conditions occur at the highest core burnup, e.g., end of cycle (EOC). Therefore, RCS make-up to ensure adequate Shutdown Margin (SDM) is maintained should begin no later than 25 hours after the start of the ELAP/LUHS event.

MPS3 currently has Westinghouse RCP seals installed. Current plans are to replace these seals with Flowserve N-9000 seals. Two seals will be replaced in 2014 and two more in 2016. Once the low leakage seals are installed, the times to natural circulation flow breakdown and core uncovery will be extended significantly.

Details:	
C.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* RCS inventory is preserved by isolating or verifying isolated potential RCS letdown paths. (RCS letdown isolation valves, pressurizer PORVs, reactor vent valves, and RCP seal water return valve) Current procedures verify isolation of potential letdown paths and no revisions to these procedures are anticipated to accomplish Phase 1 for RCS Inventory Control.
C.1.2 -Identify modifications	*List modifications* No modifications are required for the Phase 1 strategy.
C.1.3 - Key Reactor Parameters	*List instrumentation credited for this coping evaluation.* SG Pressure: SG pressure indication is available from the MCR and the auxiliary shutdown panel. SG pressure indication is available throughout the event. RCS Hot Leg Temperature: RCS hot-leg temperature indication is available from the MCR and the auxiliary shutdown panel. Hot leg temperature indication is available throughout the event.

C. Maintain RCS Inventory Control	
	RCS Cold Leg Temperature: RCS cold-leg temperature indication is available from the MCR and the auxiliary shutdown panel. Cold leg temperature indication is available throughout the event. Pressurizer Level: Pressurizer level indication is available from the MCR and the auxiliary shutdown panel. Pressurizer level indication is available throughout the event. RCS Wide Range Pressure: RCS wide range pressure indication is available from the Control Room and auxiliary shutdown panel. RCS wide range pressure indication is available throughout the event. Reactor Vessel Level Indication System (RVLIS): RVLIS indication is available from the MCR and the ICC cabinet. RVLIS is available throughout the event.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

WCAP-17601, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs," August 2012.

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C. Maintain RCS Inventory Control

C.2 - PWR Portable Equipment Phase 2:

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

In order to ensure RCS inventory and reactivity controls are maintained, a portable, diesel powered, BDB RCS injection pump will be available to add borated water from the RWST to the RCS beginning at approximately 20 hours into the event. The pump will be capable of providing a flow rate of 40 gpm with high pressure (greater than nominal operating pressure) discharge capability. This will ensure adequate shutdown margin is maintained and RCS inventory can be restored to the pressurizer.

The portable BDB RCS injection pump will be transported from a BDB Storage Building(s) and positioned in the Protected Area adjacent to the DWST. (See Figure 1)). A high pressure hose will be routed from the pump discharge to a permanent hose connection, which provides a flow path to the RCS. A second hose will be routed from the pump suction to another permanent hose connection that provides a flow path from the RWST.

Deployment of the BDB RCS Injection pump will start approximately 18 hours after the event. By this time, the path from the BDB Storage Building(s) will have been cleared for deployment of other BDB equipment. Allowing 2 hours to transport the pump from the BDB Storage Building(s) and connect the suction and discharge hoses, the pump could begin flow to the RCS within 20 hours. This is well before the 25-hour required time identified in Section C.1 to reactivity is maintained at K-eff <0.99.

Primary water supply – RWST

The RWST is the preferred borated water source. A hose will be run from the suction of the portable BDB RCS injection pump to the suction side of SI pump 3SIH*P1A to supply borated water from the RWST. The RWST is a safety related, seismically qualified storage tank, but is not missile protected. The tank contains a minimum of 1,166,000 gal of borated water at a concentration of greater than 2700 ppm. (See Figure 4)

Alternate water supply – Batching Tank

In the event the RWST is damaged or should become unavailable as a borated water source for RCS make-up, a FLEX strategy to support using a 1000 gallon portable boric acid mixing tank has been developed. This mixing tank would be transported from the on-site BDB Storage Building(s) and positioned near the BDB RCS injection pump. The tank would be filled with water, and powdered boric acid would be added and mixed to the proper boric acid concentration needed to maintain adequate shutdown margin and RCS inventory. Bags of powdered boric acid are easy to deploy to any area of the plant where the batching tanks are required.

C. Maintain RCS Inventory Control

C.2 - PWR Portable Equipment Phase 2:

Primary RCS injection path

Discharge from the BDB RCS Injection pump will be into a high pressure hose which will be routed to the primary discharge hose connection in the "A" SI cubicle for RCS makeup. This hose connection will be on the discharge side of SI pump 3SIH*P1A. (See Figure 4)

The alternate connection for RCS makeup is through check valve 3SIH*V18 located in the "B" safety injection pump cubicle. The connection is in the 4-inch discharge line, 3-SIH-004-36-2(B-), from safety injection pump 3-SIH*P1B. The valve cap shall be removed from the check valve and a 2 ½-inch hose adapter and gasket stored in the BDB Storage Building(s) shall be used to provide an alternate flow path. (See Figure 5)

Boration Requirements

Analysis of reactivity requirements determined that because of post trip xenon buildup and decay, for the limiting EOC case, assuming cooldown to the SG pressure of 290 psig, boration is not needed before about 25 hours. Since deployment of BDB RCS Injection pump for makeup and boration is expected before 20 hours, adequate margin is maintained. The studies also show that very small RCS makeup flows (~5 gpm) at a boron concentration of 2700 ppm or greater provide adequate boration rates to offset the cooldown and xenon decay. The expected flow from the BDB RCS Injection pump, around 40 gpm, will provide additional Shutdown Margin. A total injection of 6500 gallons of 2700 ppm boric acid solution will offset xenon buildup for an indefinite period at a SG pressure of 290 psig. To offset the reactivity effect of further cooling, additional boration should be performed prior to resuming the cooldown.

Based on the potential for the formation of reactor head voiding during RCS natural circulation cooling following an ELAP, an evaluation of the need to establish a RCS vent path in order to successfully implement the RCS inventory and reactivity control strategy was performed. The evaluation considered the anticipated void formation and size, the low leakage expected from the RCS, and the volume of borated water injection necessary for adequate shutdown margin. Based on the small volume of water to be injected, and the high pressure capability of the BDB RCS injection pump, RCS venting is not anticipated to be required. In the event that RCS venting becomes necessary or desirable, the remotely-operated reactor head vent valves have been evaluated and determined to provide adequate venting capability to reduce head voiding and allow RCS injection.

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C. Maintain RCS Inventory Control	
C.2 - PWR Portable Equipment Phase 2:	
Details:	
C.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Site specific procedural guidance governing the core cooling and heat removal strategies will be developed using industry guidance, and will address the necessary steps to deploy portable pumps and hoses, establish connections, and operate the portable equipment to perform the required function. **[Open Item 7]**
C.2.2 - Identify modifications	*List modifications* Installation of a permanent connection that tees into the 4-inch safety injection piping on the discharge side of SI pump 3SIH*P1A near the containment penetration area in the ESF Building. **[Open Item 12]** Installation of permanent 4-inch connection that tees into the 6-inch safety injection piping on the suction side of safety injection pump 3SIH*P1A in the ESF Building. **[Open Item 12]**
C.2.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 2 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section C.1.3 for Phase 1. Portable BDB equipment will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

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C. Maintain RCS Inventory Control	
C.2 - PWR Portable Equipment Phase 2:	
C.2.4 - Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List Protection or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

C.2.5 - Deployment Conceptual Modification **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.*	*Identify modifications* A primary discharge connection for RCS makeup	*Identify how the connection is protected.* The primary suction and

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C. Maintain RCS Inventory Control		
C.2 - PWR Portable Equipment Phase 2:		
The portable BDB RCS injection pump will be transported from a BDB Storage Building(s) and positioned in the protected area adjacent to the DWST. A high pressure hose will be run from the discharge of the pump to the primary discharge hose connection in the "A" SI cubicle for RCS makeup. This hose connection will be on the discharge side of SI pump 3SIH*P1A. A hose will be run from the suction of the portable BDB RCS injection pump to the suction side of SI pump 3SIH*P1A to supply borated water from the RWST.	will be installed. The connection will be a SS pipe connection that tees into the existing 4-inch safety injection piping on the discharge side of SI pump 3SIH*P1A. The line will be located on the 21'-6" floor elevation inside the ESF building in the 3SIH*P1A cubicle. The connection will include two manual isolation valves, a check valve and a hose end connection suitable for coupling to the high pressure discharge hose from the BDB RCS injection pump. **[Open Item 12]** The primary suction connection for RCS makeup will be a 4-inch SS pipe connection that tees into the existing 6-inch safety injection piping on the suction side of the safety injection pump 3SIH*P1A near the containment penetration area. The 4-inch line will be located on the 21'-6" floor elevation inside the ESF building in the 3SIH*P1A cubicle. The connection will include two manual isolation valves and a hose end connection suitable for coupling to the suction hose for the BDB RCS injection pump. **[Open Item 12]**	discharge connections are seismically designed and located inside the ESF building, which provides high wind and associated missile protection.
b. The alternate connection for RCS makeup is through check valve 3SIH*V18	No modifications are required to use the alternate connection.	The RCS alternate makeup pipe connection is seismically designed and located inside the

C. Maintain RCS Inventory Control		
C.2 - PWR Portable Equipment Phase 2:		
located in the "B" safety injection pump cubicle. The connection is in the 4-inch discharge line, 3-SIH-004-36-2(B-), from safety injection pump 3-SIH*P1B. The valve cap shall be removed from the check valve and a hose adapter and gasket stored in the BDB Storage Building(s) shall be used to provide an alternate flow path. The hose adapter fitting will be the same as that used on the primary connection.		ESF building, which provides high wind and associated missile protection.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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C. Maintain RCS Inventory Control	
C.3 - PWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain RCS inventory. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time. Additional pumps, if needed, will be provided from the RRC to provide backup to the BDB RCS Injection pumps or other equipment that may be needed. The RRC pumps provide backup capability should multiple failures occur during extended operation after several days or weeks from the event.	
Details:	
C.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* See Section C.2.1.
C.3.2 - Identify modifications	*List modifications* No modifications required for Phase 3.
C.3.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* The Phase 3 strategy utilizes the same Key Reactor Parameters and associated indications as described in Section C.1.3 for Phase 1. Portable BDB equipment from the RRC will be supplied with local instrumentation needed to operate the equipment. The use of these instruments will be in the associated procedures for use of the equipment. These procedures will be based on inputs from the equipment suppliers, operation experience and expected equipment function in an ELAP.

C.3.4 - Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Phase 3 equipment, if needed, will be provided by the RRC which is to be located in Memphis, TN. Equipment	*Identify modifications* No modifications have been identified to support Phase 3 deployment activities.	*Identify how the connection is protected* See Section C.2.5

C. Maintain RCS Inventory Control		
C.3 - PWR Portable Equipment Phase 3:		
transported to the site will be either immediately staged at the point of use location (pumps and generators) or temporarily stored at the designated lay down area until moved to the point of use area. Pre-determined deployment paths will be used to move equipment as necessary.		
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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D. 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)**	
D.1 - PWR Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/Hydrogen igniter) and strategy(ies) utilized to achieve this coping time. The Phase 1 coping strategy for containment involves verifying containment isolation per ECA-0.0, Loss of All AC Power, and continuing to monitoring containment pressure using installed instrumentation. Evaluations have been performed and conclude that containment temperature and pressure will remain below design limits and key parameter instruments subject to containment environment will remain functional for at least 7 days. Therefore, actions to reduce containment temperature and pressure and ensure continued functionality of the key parameters will not be required prior to this time and will utilize off-site equipment and resources during Phase 3.	
Details:	
D.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Procedural guidance for monitoring containment pressure is provided by ECA-0.0, Loss of All AC power.
D.1.2 - Identify modifications	*List modifications* No plant modifications are required to support implementation of this Phase 1 strategy.
D.1.3 - Key Containment Parameters	*List instrumentation credited for this coping evaluation.* Containment Pressure: Containment pressure indication is available in the MCR throughout the event.

[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.

D. Maintain Containment

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0

Calculation MISC-11793, "Evaluation of Long Term Containment Pressure and Temperature Profiles Following Loss of Extended AC Power (ELAP)"

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D. Maintain Containment	
D.2 - PWR Portable Equipment Phase 2:	
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time. Evaluations have been performed and conclude that containment temperature and pressure will remain below design limits and key parameter instruments subject to containment environment will remain functional for at least 7 days. Therefore, actions to reduce containment temperature and pressure and ensure continued functionality of the key parameters will not be required prior to this time and will utilize off-site equipment and resources during Phase 3. There is no separate Phase 2 strategy.	
Details:	
D.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* None required for Phase 2.
D.2.2 - Identify modifications	*List modifications* None required for Phase 2
D.2.3 - Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Although no Phase 2 strategy is required to maintain containment, the Phase 1 containment monitoring instrumentation will continue to be powered during Phase 2 due to the use of portable generators.
D.2.4 - Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* None required for Phase 2
Flooding	*List how equipment is protected or schedule to protect* None required for Phase 2

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D. Maintain Containment	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* None required for Phase 2
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* None required for Phase 2
High Temperatures	*List how equipment is protected or schedule to protect* None required for Phase 2

D.2.5 - Deployment Conceptual Modification **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use* None required for Phase 2	*Identify modifications* None required for Phase 2	*Identify how the connection is protected* None required for Phase 2

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

Calculation MISC-11793, "Evaluation of Long Term Containment Pressure and Temperature Profiles Following Loss of Extended AC Power (ELAP)"

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D. Maintain Containment

D.3 - PWR Portable Equipment Phase 3:

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

Further analysis is required to determine the strategy and time requirements for actions beyond seven days to reduce containment pressure and temperature, if any. As such, the Phase 3 coping strategy to maintain containment integrity is under development. Methods to monitor and evaluate containment conditions and depressurize/cool containment, if necessary, will be provided in a future update. **[Open Item 4]**

Details:

D.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Phase 3 procedure guidance to assess containment conditions and depressurize/cool containment will be developed later.
D.3.2 - Identify modifications	*List modifications* To be determined.
D.3.3 - Key Containment Parameters	*List instrumentation credited for this coping evaluation.* Containment Pressure: Containment pressure indication is available in the control room throughout the event.

D.3.4 - Deployment Conceptual Modification
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Phase 3 strategies to assess containment conditions and deploy equipment to depressurize/cool containment will be developed later.	*Identify modifications* Any modifications for future Phase 3 strategies to assess containment conditions and deploy equipment to depressurize/cool containment will be developed later.	*Identify how the connection is protected* Protection of connections for future Phase 3 strategies to assess containment conditions and deploy equipment to depressurize/cool containment will be identified later.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

E. Maintain Spent Fuel Pool Cooling

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

- **Makeup with Portable Injection Source**

E.1 - PWR Installed Equipment Phase 1:

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

Following the occurrence of an ELAP/LUHS event, normal SFP cooling capability is lost which, in the long term, can result in SFP boiling and loss of adequate SFP level for adequate spent fuel cooling. Conservative analysis has shown that, based on the limiting fuel storage scenario resulting in maximum design heat load, with no operator action, the SFP will reach 212 deg F in approximately 10 hours and boil off to a level 10 feet above the top of fuel in approximately 50 hours from initiation of the event.

Based on the extended time available for action to supplement SFP cooling, the Phase 1 coping strategy is to monitor SFP level, using instrumentation to be installed as required by NRC Order EA-12-051.

Details:	
E.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* The Phase 1 coping strategy for SFP cooling is to monitor SFP level using instrumentation to be installed as required by NRC Order EA-12-051.
E.1.2 - Identify modifications	*List modifications* No additional modifications are required other than installation of the BDB SFP level monitoring instruments as required by NRC Order EA-12-051.
E.1.3 - Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation. Per EA-12-051* SFP water level: Water level indication will be provided in accordance with the requirements of NRC Order EA-12-051. Water level indication will be available throughout the event.

[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.

Notes:

The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

E. Maintain Spent Fuel Pool Cooling

E.2 - PWR Portable Equipment Phase 2:

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

As described in Section E.1, Phase 1 coping for maintaining the fuel in the SFP adequately cooled following an ELAP/LUHS will be accomplished by monitoring SFP level using the BDB SFP instrumentation installed as required by NRC Order EA-12-051. SFP cooling will be maintained by providing makeup to the pool using on-site portable equipment stored in the BDB Storage Building(s). Makeup to the SFP will be required prior to 50 hours, at which time continued pool boiling is calculated to reduce the pool level to within ten feet of the top of stored fuel.

a. The primary coping strategy for SFP cooling is to utilize the fire truck or BDB High Capacity pump, deployed as described in Section B.2, to provide makeup water flow to the pool. The water will be draw from the barge slip and pumped to the pool through a flexible hose connected to the pre-installed, seismically-designed, and robustly missile protected SFP makeup connection installed on the south wall of the Fuel Building loading bay area (Figure 6). The flowpath for SFP make-up is through an existing open ended line which provides flow directly into the pool. Since the BDB SFP makeup connection is protected, and other necessary equipment is deployed from the BDB Storage Building(s), this SFP makeup capability will be available for the external hazards described in Section A.1.

b. The alternate capability for SFP makeup utilizes methods developed for compliance with 10 CFR 50.54(hh)(2) (consistent with NEI 12-06 Table D). The fire truck or the BDB High Capacity pump would provide flow from the barge slip through portable spray nozzles that will be set-up on the deck near the SFP, or through a flexible hose that will be routed over the edge of the pool. The staging of equipment within the Fuel Building can be accomplished before the SFP area becomes inaccessible since pool boiling is not anticipated until after 10 hours and Fuel Building access is expected to be available for a considerable time after boiling begins.

The fire truck or the BDB High Capacity pump will provide SFP makeup capability of up to 250 gpm, which exceeds the calculated boil-off rate of 88 gpm. Hydraulic analysis of the flow paths from the barge slip to the SFP for each of the makeup methods described above will be performed to confirm that applicable performance requirements are met. **[Open Item 5]**

Per NEI 12-06, a vent pathway for removal of steam and condensate from the SFP area is required as steam from pool boiling can condense and cause access and equipment problems in other parts of the plant. Following a BDB event, a vent pathway would be required in the event of SFP bulk boiling and can be established by opening the Fuel Building roll-up doors for inlet and outlet air flow.

Italicized text is part of the NEI standard template and is retained for information purposes.

E. Maintain Spent Fuel Pool Cooling	
Details:	
E.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Site-specific procedural guidance governing the SFP cooling will be developed using industry guidance, and will address the necessary steps to deploy portable pumps and hoses, establish connections, operate the portable equipment to perform the required function, and establish a SFP area vent pathway. **[Open Item 7]**
E.2.2 - Identify modifications	*List modifications* a. Primary strategy – A new BDB pipe connection on the south wall of the Fuel Building loading area. **[Open Item 12]** b.
E.2.3 - Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation. Per EA-12-051* SFP water level: Water level indication will be provided in accordance with the requirements of NRC Order EA-12-051. Water level indication will be available throughout the event.
E.2.4 - Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.

Italicized text is part of the NEI standard template and is retained for information purposes.

E. Maintain Spent Fuel Pool Cooling	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB pumps, necessary hoses and fittings will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

E.2.5 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
a. The primary coping strategy for SFP cooling is to utilize the fire truck or BDB High Capacity pump to provide makeup water flow to the pool. The water will be draw from the barge slip to the pool through a flexible hose connected to the pre-installed, seismically-designed, and robustly missile protected SFP makeup connection installed on the south wall of the Fuel Building loading bay area which provides flow directly into the pool.	A new BDB pipe connection on the south interior wall of the Fuel Building loading bay area will be installed. The piping will be seismically designed and missile protected. The BDB pipe connection for the SFP will tie into an existing open ended line which will discharge directly into the SFP. **[Open Item 12]**	The new BDB pipe connection on the south interior wall of the Fuel Building loading bay area will not be subject to flooding and will be seismically designed. The connection is robustly protected from wind generated missiles since it is located well inside the Fuel Building loading bay. In the event that the connection is damaged, the alternate approach to the SFP cooling remains available.
b. The alternate SFP makeup/spray strategy is implemented either by running a hose directly to the SFP area or connecting to two monitor	No modifications are required to deploy the alternate SFP makeup/spray strategy.	To implement the alternate makeup/spray strategy, all connections are made to a portable BDB pump, fire truck, hoses and spray monitors after

E. Maintain Spent Fuel Pool Cooling		
nozzles and spraying the pool directly. Makeup water will be provided from one branch of the MPS3 water thief being supplied from the fire truck or the BDB High Capacity pump located at the barge slip.		the BDB event. The equipment, and any connections between the equipment, are protected from all external events since they are in storage until after the BDB event.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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E. Maintain Spent Fuel Pool Cooling

E.3 - PWR Portable Equipment Phase 3:

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

Although a separate Phase 3 strategy is not required to maintain SFP cooling, the Phase 2 SFP makeup strategies may be maintained using offsite pumps as a backup to the onsite portable pumps should they required maintenance or fail.

Details:

E.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* No separate strategies are required for Phase 3
E.3.2 - Identify modifications	*List modifications* No separate modifications are required for Phase 3
E.3.3 - Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation. Per EA-12-051* SFP water level: Water level indication will be provided in accordance with the requirements of NRC Order EA-12-051. Water level indication will be available throughout the event.

E.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
Identify Strategy including how the equipment will be deployed to the point of use. Although a separate Phase 3 strategy is not required to maintain SFP cooling, pumps from the RRC may be deployed to the same Phase 2 equipment deployment location if the onsite portable pumps are unavailable.	*Identify modifications* No separate modifications are required for Phase 3	*Identify how the connection is protected* No separate connections are required for Phase 3

E. Maintain Spent Fuel Pool Cooling

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

F1. Safety Functions Support (Electrical)

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

F1.1 - PWR Installed Equipment Phase 1

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

Successful implementation of FLEX strategies relies on several support functions. An important support function is to maintain electrical power to key parameter monitoring instrumentation that is necessary to successfully implement planned FLEX strategies. The Phase 1 strategy to provide this support function involves extending the available electrical power from the installed Class 1E 125 VDC batteries, 301A and 301B, through reduction of DC bus loading soon after the occurrence of an ELAP/LUHS by stripping non-essential loads from the 125 VDC and the battery-backed 120 VAC vital buses. Essential instrumentation necessary for key parameter monitoring is powered by the 120 VAC vital bus circuits, which will be maintained energized by 125 VDC battery bus through the Class 1E inverters following an ELAP.

Based on a review of instrumentation to provide key parameter monitoring for FLEX strategies, a load list was developed to identify essential circuits. Based on this list, a battery load analysis will be performed to determine the extended battery life resulting from load stripping of the non-essential loads. **[Open Item 2]** The analysis will include the assumption that load stripping would begin within 45 minutes after the occurrence of an ELAP/LUHS and completed within the next 30 minutes. If insufficient time is available to implement the Phase 2 re-powering strategy, either modifications to increase battery life will be implemented or revisions to accelerate the re-powering strategy will be developed. **[Open Item 12]**

The vital AC and DC distribution system and associated equipment is seismically-designed and installed in protected areas of the plant and is expected to remain available following an ELAP/LUHS. However, in the unlikely event of vital AC and DC infrastructure damage due a seismic event or other hazard, key parameter monitoring capability can be provided using methods, such as repowering instruments locally, that are currently addressed by existing site procedures previously developed to respond to extreme events.

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

Italicized text is part of the NEI standard template and is retained for information purposes.

Details:	
F1.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* An evaluation will be performed to determine if the Class 1E 125 VDC station batteries can provide sufficient voltage for the required Phase 1 strategy loads for an adequate amount of time to implement the Phase 2 re-powering strategy for MPS3 **[Open Item 2]**. This evaluation will assume that load stripping starts within 45 minutes after the ELAP/LUHS event occurs and is completed within the next 30 minutes. If insufficient time is available to implement the Phase 2 re-powering strategy, either modifications to increase battery life will be implemented or revisions to accelerate the re-powering strategy will be developed. **[Open Item 12]** Procedures currently direct the operators to load strip all non-essential DC loads after the unit is stabilized. However, to achieve the extended battery time, additional load stripping may be necessary. Site specific procedural guidance governing load stripping will be developed. **[Open Item 7]**
F1.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications are required to implement Phase 1 at this time.
F1.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* MCR instrumentation is available to monitor the Class 1E vital battery bus voltage during Phase 1 of an ELAP/LUHS event. Instrumentation will be available to monitor key parameters during Phase 1 activities as a result of the successful implementation of the load stripping activities. These key parameters are listed in Sections B.1.3, C.1.3, and D.1.3.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.	

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F1. Safety Functions Support (Electrical)

F1.2 - PWR Portable Equipment Phase 2

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

Prior to depletion of the Class 1E 125VDC batteries, vital 120 VAC circuits will be re-powered to continue to provide key parameter monitoring instrumentation using portable DGs stored on-site. Additional key parameter monitoring instrumentation, down-powered for load stripping in Phase 1, will be restored when 120VAC re-powering is implemented.

The primary strategy for re-powering 120VAC vital bus circuits is the deployment of two 120/240 VAC DGs per unit connected to 120VAC vital buses through pre-installed BDB cabling, and connections. The portable 120/240 VAC DGs (and connecting power cables) will be deployed from their protected storage location to the area between the MPS3 Emergency Diesel Generator Building and the Maintenance Building (See Figure 6). Cables will be run from the portable DGs to seismically-designed, tornado missile protected BDB connection receptacles accessible through the Service Building doorway. The BDB receptacles will be connected to a transfer switch in the supply cable to the 120 VAC vital bus panels, VIAC1 and VIAC3 (See Figure 7).

The alternate strategy for re-powering 120 VAC vital bus circuits is the connection of one 480 VAC DG to the Class 1E 480 VAC bus through pre-installed BDB cabling and connections. The 480 VAC DG would allow for recharging the Class 1E 125 VDC batteries and restoration of other AC loads in addition to the key parameter monitoring instrumentation, such as selected lighting. The 480 VAC DG (and necessary connecting power cables) will be pre-staged near the area between the MPS3 Emergency Diesel Generator Building and the Maintenance Building (See Figure 6). The power cables will be connected to seismically-designed, tornado missile protected BDB connection receptacles accessible through the Service Building doorway. The BDB connection receptacles will be connected to the Class 1E 480 VAC bus via pre-installed cable and conduit to Class 1E 480VAC MCC breakers (See Figure 8).

The final performance criteria for the DGs will be determined by an electrical loading analysis. Cabling and connector sizing will be matched to the performance criteria. **[Open Item 13]**

Details:

F1.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-powering strategies will be developed using industry guidance. Procedures will include the necessary steps to deploy and connect the

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F1. Safety Functions Support (Electrical)	
F1.2 - PWR Portable Equipment Phase 2	
	120/240 VAC DGs and the 480 VAC DG to the BDB connection receptacles, to start the generators, and to connect selected loads to the re-powered panels and buses. **[Open Item 7]**
F1.2.2 - Identify modifications	*List modifications necessary for phase 2.* A modification on each unit will install the BDB connection receptacles for the cables from the portable 120/240 VAC DGs. **[Open Item 12]** A modification on each unit will install the BDB connection receptacles for the cables from the portable 480 VAC DGs. **[Open Item 12]**
F1.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* No instrumentation is credited to monitor the re-powered AC distribution system during Phase 2 of an ELAP event. Local instrumentation on the portable DG units will monitor the generator performance. Instrumentation will be available to monitor key parameters during Phase 2 activities as a result of the successful re-powering of the vital 120 VAC buses. These key parameters are listed in Sections B.2.3, C.2.3, and D.2.3.

F1.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from seismic events while stored in either the BDB Storage Building(s) or in seismic protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from flooding events while stored in either the BDB Storage Building(s) or in flood protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*

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F1. Safety Functions Support (Electrical)		
F1.2 - PWR Portable Equipment Phase 2		
	The BDB portable diesel generators, necessary cables and connectors will be protected from severe storms with high wind events while stored in either the BDB Storage Building(s) or in wind/missile protected areas of the plant.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from snow, ice and extreme cold events while stored in either the BDB Storage Building(s) or in weather protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.	
High Temperatures	*List how equipment is protected or schedule to protect* The BDB portable diesel generators, necessary cables and connectors will be protected from high temperature events while stored in either the BDB Storage Building(s) or in weather protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.	
F1.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The 120/240 VAC DG and connection cables will be transported from their storage location(s) to a location outside the MPS3 Maintenance Building just behind the MPS3 Emergency Diesel Generator Building. Cables will be run from the portable DGs to BDB connection receptacles which will be accessible through Service Building doors.	*Identify modifications* A modification will install the 120/240 VAC BDB connection receptacles at locations accessible from the area between the MPS3 Emergency Diesel Generators and the Maintenance Building. The receptacles will be seismically mounted, protected from high wind/tornado missile, floods and extreme temperatures. From the receptacles, Class 1E cables and conduit will be installed to a transfer switch between inverters 1 and 3 and panels VIAC1 and VIAC3.	*Identify how the connection is protected* The 120VAC BDB connection receptacles will be seismically mounted in a Class I structure protected from wind generated missiles, flooding and extreme temperatures. Therefore, the connection is protected from the extreme external hazards identified in Section A.1.

Italicized text is part of the NEI standard template and is retained for information purposes.

F1. Safety Functions Support (Electrical)		
F1.2 - PWR Portable Equipment Phase 2		
	[Open Item 12]	
b. The 480 VAC DG will be pre-staged in a protected structure near the MPS3 Maintenance Building. No transport is required for deployment. The power cables will be used to connect the DGs to the 480 VAC BDB connection receptacles which will be accessible through the Service Building door.	A modification will install the 480 VAC BDB connection receptacles at a location accessible from the pre-staged 480 VAC DG. The modification will include the BDB connection receptacle and the installation of a new breaker in a spare location on Class 1E 480 VAC bus 32T. The receptacles will be seismically mounted, protected from high wind/tornado missile, floods and extreme temperatures. From the receptacles, Class 1E cables and conduit will be installed to the 480 VAC bus. **[Open Item 12]**	The 480VAC BDB connection receptacles will be seismically mounted in a Class I structure protected from wind generated missiles, flooding and extreme temperatures. Therefore, the connection is protected from the extreme external hazards identified in Section A.1.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

F1. Safety Functions Support (Electrical)

F1.3 - PWR Portable Equipment Phase 3

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

The Phase 3 coping strategy is to obtain additional electrical capability and redundancy for on-site equipment until such time that normal power to the site can be restored. This will be provided by a 4160 VAC portable DG as described below.

4160 VAC Diesel Generator - One 4160 VAC mobile DG will be brought in from the RRC in order to supply power to a Class 1E 4160 VAC bus. The DG will be deployed to the area between the MPS3 Emergency Diesel Generator Building and the Maintenance Building. (See Figure 6) Power cables will be stored in the BDB Storage Building(s) and will be run from the DG to a 4160 VAC BDB connection receptacle. Cabling from the receptacle will be routed through seismically designed conduits to the non-vital 4160 VAC bus.

The 4160 VAC mobile DG can provide power to a non-vital 4160 VAC Bus which can then power a vital 4160 bus. Additionally, by restoring the vital 4160VAC bus, power can be restored to the Class 1E 480 VAC via the 4160/480 VAC transformers to power selected 480 VAC loads. (See Figure 9)

The final performance criteria for the DG will be determined by an electrical loading analysis performed in accordance with the design process. Cabling and connector sizing will be matched to the performance criteria. **[Open Item 13]**

Details:

F1.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-powering strategies will be developed using industry guidance. Procedures will include the necessary steps to connect the 4160 VAC DG to the Emergency 4160 VAC Bus, to start the generators, and to re-power the emergency buses. **[Open Item 7]**
F1.3.2 - Identify modifications	*List modifications necessary for phase 3.* A modification on each unit will install the BDB connection receptacles for the cables from the portable 4160 VAC DGs. **[Open Item 12]**

Italicized text is part of the NEI standard template and is retained for information purposes.

F1. Safety Functions Support (Electrical)	
F1.3 - PWR Portable Equipment Phase 3	
F1.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* No instrumentation is credited to monitor the re-powered AC distribution system during Phase 3 of an ELAP event. Local instrumentation on the portable DG units will monitor the generator performance. Instrumentation will be available to monitor key parameters during Phase 3 activities and is the same instrumentation as for Phase 2. These key parameters are listed in Sections B.2.3, C.2.3, and D.2.3.

F1.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The 4160 VAC portable DG will be brought in from the RRC and deployed to an area between the MPS3 Emergency Diesel Generator Building and the Maintenance Building. From there, power cables will be run to the 4160 VAC BDB connection receptacles which will be accessible through the Service Building.	*Identify modifications.* A modification will install the 4160 VAC BDB connection receptacle at a location accessible from the deployed DG. The modification will include the BDB connection receptacle and the installation of a new breakers in a spare location on the non-vital 4160 VAC bus. Cable from this breaker will be seismically routed to the BDB connection receptacle. **[Open Item 12]**	*Identify how the connection is protected.* The 4160 VAC BDB connection receptacles will be seismically mounted in a Class I structure protected from wind generated missiles, flooding and extreme temperatures. Therefore, the connection is protected from the extreme external hazards identified in Section A.1.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis - FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

F2. Safety Functions Support (Fuel)

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

F2.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involves several elements. One element is maintaining fuel to necessary diesel powered generators, pumps, hauling vehicles, compressors, etc. The general coping strategy for supplying fuel oil to diesel driven portable equipment, i.e., pumps and generators, being utilized during Phases 2 and 3, is to draw fuel oil out of any of the existing diesel fuel oil tanks on the MPS site that are available. The coping strategy for supplying fuel oil to BDB equipment indefinitely is not unit specific. Fuel oil from any storage tank on site will be available to refill BDB equipment being utilized for either MPS2 or MPS3 service.

Details:

F2.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* No procedures or guidelines related to fueling of BDB equipment are required during Phase 1.
F2.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications related to fueling of BDB equipment are required during Phase 1.
F2.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* There are no key parameters related to fueling of BDB equipment applicable to Phase 1

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis - FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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

Italicized text is part of the NEI standard template and is retained for information purposes.

F2. Safety Functions Support (Fuel)	
F2.2 - PWR Portable Equipment Phase 2	
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Fuel is required for BDB equipment during Phase 2 and Phase 3 of the coping strategy. The primary source of fuel oil for portable equipment will be the MPS2 Diesel Day Tanks. These tanks contain 26,000 gallons of diesel fuel. The tanks are seismically mounted and missile protected. They are located on the 38'6" level of the MPS2 Auxiliary Building, so they are well above the flood plain. Being approximately 24 feet above the MPS2 grade, gravity can be used to transfer the oil to drums for transporting the fuel to the portable equipment. No pumps are necessary. A secondary source for fuel oil will be the MPS3 Diesel Fuel Oil Storage Tanks. These underground tanks contain 35,000 gallons of fuel oil. They are seismic and missile protected. However, a pump is required to transfer this fuel to drums. An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed including any gasoline required for small miscellaneous equipment. **[Open Item 14]**	
Details:	
F2.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-fueling strategies will be developed using industry guidance, and will address the monitoring of fuel supplies and consumption in order to initiate refueling activities prior to equipment shutdown. **[Open Item 7]**
F2.2.2 - Identify modifications	*List modifications necessary for phase 2* No modifications are required to provide fueling capabilities during Phase 2.
F2.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* The specifications for local instrumentation for portable diesel powered BDB equipment will include fuel gauges. Monitoring of fuel supplies and consumption in order to initiate refueling activities prior to equipment shutdown will be performed. (See Section F2.2.1).

Italicized text is part of the NEI standard template and is retained for information purposes.

F2.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB fuel carts, pumps, necessary hoses, fittings, and containers will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

Italicized text is part of the NEI standard template and is retained for information purposes.

F2.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The BDB Storage Building(s) will have fuel carts to provide the necessary equipment to transfer fuel from storage tanks to the deployed portable equipment. Equipment for clearing potential obstructions which could inhibit mobility of the fuel carts and fuel transfers is also stored within the BDB Storage Building(s) A pre-staged hose adapter can be connected to the drain valve of either MPS2 Day Tank. The hose then is run through the 38 ft 6 in Aux Building down to the Health Physics RCA entrance area door to outside. The outside end of the hose is fitted with a manual ball valve. The diesel fuel can then be gravity fed to suitable fuel containers. The containers will be trucked to the various portable equipment locations, where the fuel will be transferred by hand operated pumps from the fuel containers. Fuel oil can also be removed from the, MPS3 Underground Storage Tanks using a portable fuel pump assembly to fill suitable fuel containers for distribution.	*Identify modifications* No modifications are required to provide fueling capabilities during Phase 2.	*Identify how the connection is protected* The connection to access the primary fuel supply in the re-fueling strategy are the connections from the drain valves of the MPS2 diesel day tanks located on the 38 ft 6 in level of the MPS2 Auxiliary Building. These tanks are seismically designed and are located in structures that are protected from the extreme external hazards identified in Section A.1.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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F2. Safety Functions Support (Fuel)

F2.3 - PWR Portable Equipment Phase 3

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

The coping strategy for supplying fuel oil to diesel driven portable equipment, i.e., pumps and generators, is described in Section F2.2 for Phase 2 and is the same for Phase 3.

An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed and will include Phase 3 equipment including any gasoline required for small miscellaneous equipment. The fuel strategy will evaluate the need for additional fuel required from the RRC or other offsite sources. **[Open Item 14]**

Details:

F2.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing re-fueling strategies will be developed using industry guidance as stated in Section F2.2.1.
F2.3.2 - Identify modifications	*List modifications necessary for phase 2* No modifications are required to provide fueling capabilities during Phase 3.
F2.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters related to fueling of BDB equipment applicable to Phase 3.

F2.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Same as Phase 2 as stated in Section F2.2.5.	*Identify modifications* Same as Phase 2 as stated in Section F2.2.5.	*Identify how the connection is protected* Same as Phase 2 as stated in Section F2.2.5.

F2. Safety Functions Support (Fuel)
F2.3 - PWR Portable Equipment Phase 3
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

F3. Safety Functions Support (Lighting)

Determine Baseline coping capability with installed coping[7] modifications not including FLEX modifications.

F3.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involves several elements. One necessary element is maintaining sufficient lighting in areas needed to successfully implement the planned FLEX strategies. MPS3 initially relies on emergency lighting installed for Fire Protection/Appendix R to perform Phase 1 coping strategy activities. However, Appendix R lighting is powered by battery packs at each light and is rated for only 8 hours. This lighting also does not provide a 100% coverage of areas involving FLEX strategy activities including ingress and egress from task areas. In these areas and areas poorly lit, portable lighting and head lamps are available for use. Portable lighting is currently staged throughout the site, mainly for use by the Fire Brigade.

A lighting study will be performed to validate the adequacy of existing lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions. **[Open Item 15]**

Details:

F3.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* There are no procedures, strategies, or guidelines needed with regard to use or restoration of lighting in Phase 1 of an ELAP/LUHS event. Portable lighting is currently staged throughout the site, mainly for use by the Fire Brigade. The location of these lights will be identified in the FLEX Guidelines. **[Open Item 7]**
F3.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications are planned to provide lighting to support the implementation of Phase 1 FLEX strategies. Additional portable lighting or necessary modifications may be identified in the lighting study to be performed.

[7] 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.

Italicized text is part of the NEI standard template and is retained for information purposes.

F3.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* There are no key parameters associated with the lighting systems in any phase of the ELAP/LUHS response.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

Italicized text is part of the NEI standard template and is retained for information purposes.

F3. Safety Functions Support (Lighting)

F3.2 - PWR Portable Equipment Phase 2

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

There are three methods of providing light in areas needed to successfully implement Phase 2 FLEX strategies. First, is the continued use of the Appendix R lighting discussed in Section F3.1, however, as previously stated, this lighting is limited to approximately 8 hours. Additionally, the use of portable hand held lighting or head lamps will continue to be available for use in dark or poorly lit areas.

Second, is the use of supplemental lights that will be available as stored BDB equipment. This includes additional small portable sources (such as flashlights and head lamps) for personal uses, as well as larger portable equipment (such as self-powered light plants). The larger lighting equipment would be typically deployed in outside areas to support deployment of BDB pumps and generators. In some cases, BDB equipment will be equipped with their independent lighting sources.

Third, is the restoration of power to various lighting panels in the electrical distribution system. Connections for selected lighting are discussed in Section F1.2.

A lighting study will be performed to validate the adequacy of supplemental lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions.
[Open Item 15]

Details:

F3.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing lighting strategies will be developed using industry guidance, and will address the operation and placement of supplemental lighting stored in the BDB Storage Building(s). **[Open Item 7]** Procedures for the restoration of power to lighting panels are addressed in Section F1.2.
F3.2.2 - Identify modifications	*List modifications necessary for phase 2.* No modifications to the lighting system are planned. Modifications to facilitate restoration of power to lighting systems are addressed in Section F1.2.

Italicized text is part of the NEI standard template and is retained for information purposes.

F3. Safety Functions Support (Lighting)	
F3.2 - PWR Portable Equipment Phase 2	
F3.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the lighting systems in any phase of the ELAP/LUHS response.
F3.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* Supplemental BDB lighting equipment will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

Italicized text is part of the NEI standard template and is retained for information purposes.

F3. Safety Functions Support (Lighting)		
F3.2 - PWR Portable Equipment Phase 2		
F3.2.5 - Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Small portable lighting equipment will be distributed as needed from the BDB Storage Building(s). Large portable lighting equipment from a BDB Storage Building(s) would be deployed directly to its point of use by tow vehicles. Some BDB equipment, such as pumps or generators, may have the necessary lighting to operate that equipment incorporated as part of the equipment skid and is, therefore, deployed with the equipment.	*Identify modifications* No modifications are needed to the site or lighting systems to support FLEX strategy implementation.	*Identify how the connection is protected* The protection of connections does not apply to existing light systems or to the supplemental lighting that may be deployed from storage.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

Italicized text is part of the NEI standard template and is retained for information purposes.

F3. Safety Functions Support (Lighting)

F3.3 - PWR Portable Equipment Phase 3

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

Lighting to support Phase 3 FLEX strategies is available onsite as discussed in Section F3.2 for Phase 2 activities. No supplemental lighting is required from off-site sources such as the RRC.

Details:

F3.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* There are no additional procedures, strategies, or guidance for lighting systems other than those needed for Phase 2. (Refer to Section F3.2.1)
F3.3.2 - Identify modifications	*List modifications necessary for phase 3* No modifications to the lighting system are planned. Modifications to facilitate restoration of power to lighting systems are addressed in Section F1.2.2.
F3.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the lighting systems in any phase of the ELAP/LUHS response.

F3.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Refer to Section F3.2.5.	*Identify modifications* Refer to Section F3.2.5.	*Identify how the connection is protected* Refer to Section F3.2.5.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, “Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document,” Revision 0.

F4. Safety Functions Support (Communications)	
Determine Baseline coping capability with installed coping[8] modifications not including FLEX modifications.	
F4.1 - PWR Installed Equipment Phase 1	
Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. The FLEX strategies for maintenance and/or support of safety functions involve several elements. One element is maintaining necessary communication to support interaction between personnel in the plant and those providing overall command and control in order to successfully implement the planned FLEX strategies. Normal communications may be lost or severely hampered during and following an ELAP/LUHS event. Hand-held portable radios would be limited to line-of-sight operation due to the loss of repeater stations. Sound-powered phones, which do not require power to operate, would be available in many areas of the plant. Per the MPS letter dated October 29, 2012 (Reference Letter S/N 12-205F), a communications study will be performed in accordance with the commitments made in response to Recommendation 9.3 of the 10 CFR 50.54(f) letter dated March 12, 2012. This study will determine the adequacy of the communications equipment available after the ELAP/LUHS event (radios and sound-powered phones) and determine any additional equipment or modifications needed to implement the Phase 1 FLEX strategies. The result of this study will be provided at a later date. **[Open Item 16]**	
Details:	
F4.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any communications related procedures, strategies, and/or guidelines needed to support implementation of the Phase 1 coping strategies will be identified and developed at a later date.
F4.1.2 - Identify modifications	*List modifications and describe how they support coping time.* Any communications related modifications needed to support the implementation of the Phase 1 coping strategy will be identified at a later date.

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

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F4.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* No key parameters are credited for communications during Phase 1.

Notes:
The information provided in this section is based on the following reference(s):

- Engineering Technical Evaluation, ETE E-CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.
- Dominion Nuclear Connecticut Letter S/N 12-205F, David A. Heacock to NRC Document Control Desk, "Response to Communications Aspects of Recommendation 9.3 for Emergency Preparedness Programs," dated October 29, 2012.

F4. Safety Functions Support (Communications)

F4.2 - PWR Portable Equipment Phase 2

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

Communications equipment available in Phase 1 of an ELAP/LUHS event will continue to be available for Phase 2 activities. Hand-held radio battery life is approximately 14-18 hours.

Phase 2 BDB equipment is used to re-power the various vital buses using portable diesel generators (120 VAC and 480 VAC) as discussed in Section F1.2. Once AC power is supplied to the 120 VAC vital buses, partial plant communications would be restored. Additional (supplemental) radios and satellite phones will be stored in BDB Storage Building(s) and will be fully charged and available for use.

A comprehensive communications study will be performed as stated in Section F4.1. This study will determine the adequacy of the communications equipment available after the ELAP/LUHS event (radios and sound-powered phones) and will include the equipment available as a result of the re-powering of the 120 VAC vital buses. The study will determine any additional equipment or modifications needed to support the implementation of Phase 2 FLEX strategies. The result of this study will be provided at a later date. **[Open Item 16]**

Details:	
F4.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any communications related procedures, strategies, and/or guidelines needed to support implementation of the Phase 2 coping strategies will be identified and developed at a later date.
F4.2.2 - Identify modifications	*List modifications and describe how they support coping time.* Any communications related modifications needed to support the implementation of the Phase 2 coping strategy will be identified at a later date.
F4.2.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* No key parameters are credited for communications during Phase 2.

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)	
F4.2 - PWR Portable Equipment Phase 2	
F4.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* Supplemental BDB communications equipment will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)		
F4.2 - PWR Portable Equipment Phase 2		
F4.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use. a. Supplemental communications equipment will be deployed/ distributed from the BDB Storage Building(s) directly to its point of use.	*Identify modifications* Any communications related modifications needed to support the implementation of the Phase 2 coping strategy will be identified at a later date.	*Identify how the connection is protected* The protection of connections does not apply to existing or to supplemental communication equipment.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)
F4.3 - PWR Portable Equipment Phase 3
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Onsite communications equipment available in Phase 1 and 2 of an ELAP/LUHS event will continue to be available for Phase 3 activities. No additional communications equipment from offsite sources is anticipated. As stated in Section F3.1, a comprehensive communications study will be performed in conjunction with the commitments made in response to Recommendation 9.3 of the 10 CFR50.54(f) letter dated March 12, 2012. This study will determine the adequacy of the communications equipment available after the ELAP/LUHS event and determine any additional equipment or modifications needed to implement the Phase 1and Phase 2 FLEX strategies. The study also addresses communication capability to offsite persons and emergency response organizations. The study will address the ability to communicate with the RRC, offsite suppliers (such as fuel), and with transportation vehicles used to bring equipment and supplies to the site. This capability is required to successfully coordinate the receipt of Phase 3 equipment as required. (Refer to Section A.9) The result of this study will be provided at a later date. **[Open Item 16]**

Details:	
F4.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any communications related procedures, strategies, and/or guidelines needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be identified by the communications study and developed at a later date.
F4.3.2 - Identify modifications	*List modifications and describe how they support coping time.* Any communications related modifications needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be identified by the communications study.
F4.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* No key parameters are credited for communications during Phase 3.

Italicized text is part of the NEI standard template and is retained for information purposes.

F4. Safety Functions Support (Communications)		
F4.3 - PWR Portable Equipment Phase 3		
F4.3.4 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Any communications related equipment identified by the communications study as needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be deployed/ distributed from the BDB Storage Building(s) directly to its point of use.	*Identify modifications* Any communications related modifications needed to support receipt of equipment and/or supplies from offsite locations (Phase 3) will be identified by the communications study.	*Identify how the connection is protected* The protection of connections does not apply to existing or to supplemental communication equipment.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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F5. Safety Functions Support (Ventilation)	
Determine Baseline coping capability with installed coping[9] modifications not including FLEX modifications.	
F5.1 - PWR Installed Equipment Phase 1	
Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. The FLEX strategies for maintenance and/or support of safety functions involve several elements. One element is to ensure that ventilation, heating, and cooling is adequate to maintain acceptable environmental conditions for equipment operation and personnel habitability. Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date. **[Open Item 17]**	
Details:	
F5.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Any ventilation related procedures, strategies, and/or guidelines needed to support implementation of the Phase 1 coping strategies will be identified and developed at a later date.
F5.1.2 - Identify modifications	*List modifications and describe how they support coping time.* Any ventilation related modifications needed to support the implementation of the Phase 1 coping strategy will be identified at a later date.
F5.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* Key ventilation parameters will be identified at a later date.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.	

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

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F5. Safety Functions Support (Ventilation)	
F5.2 - PWR Portable Equipment Phase 2	
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date. **[Open Item 17]**	
Details:	
F5.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Any ventilation related procedures, strategies, and/or guidelines needed to support implementation of the Phase 2 coping strategies will be identified and developed at a later date.
F5.2.2 - Identify modifications	*List modifications necessary for phase 2* Any ventilation related modifications needed to support the implementation of the Phase 2 coping strategies will be identified at a later date.
F5.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* Key ventilation parameters will be identified at a later date.

F5.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from seismic events while stored in the BDB Storage Building(s) or in protected areas of the plant.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from flooding events while stored in the BDB Storage Building(s) or in protected areas of the plant.

Italicized text is part of the NEI standard template and is retained for information purposes.

F5. Safety Functions Support (Ventilation)		
F5.2 - PWR Portable Equipment Phase 2		
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from severe storms with high wind events while stored in the BDB Storage Building(s) or in protected areas of the plant.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from snow, ice and extreme cold events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.	
High Temperatures	*List how equipment is protected or schedule to protect* Supplemental BDB ventilation equipment will be protected from high temperature events while stored in the BDB Storage Building(s) or in protected areas of the plant to ensure equipment readiness at extreme temperatures when called upon.	
F5.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The deployment strategy for equipment needed to maintain acceptable environmental conditions for equipment operation and personnel habitability will be developed in accordance with the guidance of NEI 12-06 and will be provided at a later date after the ventilation needs are identified. **[Open Item 17]**	*Identify modifications* Any ventilation related modifications needed to support the implementation of the Phase 2 coping strategies will be identified at a later date.	*Identify how the connection is protected* Any ventilation related connections (and their protections requirements) needed to support the implementation of the Phase 2 coping strategies will be identified at a later date.

F5. Safety Functions Support (Ventilation)
F5.2 - PWR Portable Equipment Phase 2
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

F5. Safety Functions Support (Ventilation)

F5.3 - PWR Portable Equipment Phase 3

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

Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date. **[Open Item 17]**

Details:

F5.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Any ventilation related procedures, strategies, and/or guidelines needed to support implementation of the Phase 3 coping strategies will be identified and developed at a later date.
F5.3.2 - Identify modifications	*List modifications necessary for phase 3* Any ventilation related modifications needed to support the implementation of the Phase 3 coping strategies will be identified at a later date.
F5.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* Key ventilation parameters will be identified at a later date.

F5.3.4 - Deployment Conceptual Design
(Attachment 3 contains Conceptual Sketches)

Strategy	Modifications	Protection of connections
a. *Identify Strategy including how the equipment will be deployed to the point of use.* The deployment strategy for equipment needed to maintain acceptable environmental conditions for equipment operation and personnel habitability will be developed in accordance with the guidance of NEI 12-06 and will be provided at a later date after the ventilation needs are identified. **[Open Item 17]**	*Identify modifications* Any ventilation related modifications needed to support the implementation of the Phase 3 coping strategies will be identified at a later date.	*Identify how the connection is protected* Any ventilation related connections (and their protections requirements) needed to support the implementation of the Phase 3 coping strategies will be identified at a later date.

F5. Safety Functions Support (Ventilation)
F5.3 - PWR Portable Equipment Phase 3
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

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F6. Safety Functions Support (Accessibility)

Determine Baseline coping capability with installed coping[10] modifications not including FLEX modifications.

F6.1 - PWR Installed Equipment Phase 1

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

The FLEX strategies for maintenance and/or support of safety functions involves several elements. One element is the ability to access site areas required to successfully implement the planned FLEX strategy.

The potential impairments to required access are: 1) doors and gates, and 2) site debris blocking personnel or equipment access. The coping strategy to maintain site accessibility through doors and gates is applicable to all phases of the FLEX coping strategies, but is immediately required as part of Phase 1.

Doors and gates serve a variety of barrier functions on the site. One primary function is security and is discussed below. However, other barrier functions include fire, flood, radiation, ventilation, tornado, and high energy line break (HELB). As barriers, these doors and gates are typically administratively controlled to maintain their function as barriers during normal operations. Following an ELAP/LUHS event, FLEX coping strategies require the routing of hoses and cables to be run through various barriers in order to connect BDB equipment to station fluid and electric systems. For this reason, certain barriers (gates and doors) will be opened and remain open. This violation of normal administrative controls is acknowledged and is acceptable during the implementation of FLEX coping strategies.

The security doors and gates of concern are those barriers that rely on electric power to operate opening and/or locking mechanisms. The ability to open doors for ingress and egress, ventilation, or temporary cables/hoses routing is necessary to implement the FLEX coping strategies. The Security force will initiate an access contingency upon loss of the Security Diesel and all AC/DC power as part of the Security Plan. Access to the Owner Controlled Area, site Protected Area, and areas within the plant structures will be controlled under this access contingency.

Vehicle access to the Protected Area is via the double gated sally-port at the Security building. As part of the Security access contingency, the sally-port gates will be manually controlled to allow delivery of BDB equipment (e.g., generators, pumps) and other vehicles such as debris removal equipment into the Protected Area.

[10] 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.

A significant impairment may be debris on site resulting from seismic, high wind (tornado), or flooding events. This is addressed in Section F6.2 as part of the Phase 2 coping strategy.

Details:	
F6.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* An access contingency in the MPS Security Plan for loss of power situations ensures the ability of plant personnel and BDB equipment to access areas inside the plant structures as well as access from areas outside the site Protected Area to implement the planned FLEX strategies.
F6.1.2 - Identify modifications	*List modifications and describe how they support coping time.* No modifications to ensure site accessibility are planned.
F6.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* There are no key parameters associated with the site accessibility in any phase of the ELAP/LUHS response.

Notes:
The information provided in this section is based on the following reference(s):

Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.

F6. Safety Functions Support (Accessibility)

F6.2 - PWR Portable Equipment Phase 2

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

The potential impairments to required access are: 1) doors and gates, and 2) site debris blocking personnel or equipment access. The coping strategy to maintain site accessibility through doors and gates is applicable to all phases of the FLEX coping strategies. The deployment of onsite BDB equipment to implement coping strategies beyond the initial plant capabilities (Phase 1) requires that pathways between the BDB Storage Building(s) and various deployment locations be clear of debris resulting from seismic, high wind (tornado), or flooding events.

Preferred travel pathways will be determined using the guidance contained in NEI 12-06. The pathways will attempt to avoid areas with trees, power lines, and other potential obstructions and will consider the potential for soil liquefaction. **[Open Item 18]** However, debris can still interfere with these preferred travel paths. Debris removal equipment will be kept in the BDB Storage Building(s) so that it is protected from the severe storm, earthquake and flood hazards. Therefore, the debris removal equipment remains functional and deployable to clear obstructions from the travel pathways to the BDB equipment's deployed location(s).

The stored BDB equipment includes tow vehicles (small tractors) equipped with front end buckets and rear tow connections in order to move or remove debris from the needed travel paths. A front end loader will also be available to deal with more significant debris conditions.

Details:

F6.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Site specific procedural guidance governing debris removal strategies will be developed to direct activities to ensure that travel pathways are cleared as necessary for deployment of BDB equipment. **[Open Item 7]**
F6.2.2 - Identify modifications	*List modifications necessary for phase 2.* No modifications to ensure site accessibility are planned.
F6.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the site accessibility in any phase of the ELAP/LUHS response.

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F6. Safety Functions Support (Accessibility)	
F6.2 - PWR Portable Equipment Phase 2	
F6.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from seismic events while stored in the BDB Storage Building(s).
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from flooding events while stored in the BDB Storage Building(s).
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from severe storms with high wind events while stored in the BDB Storage Building(s).
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from snow, ice and extreme cold events while stored in BDB Storage Building(s) to ensure equipment readiness at extreme temperatures when called upon.
High Temperatures	*List how equipment is protected or schedule to protect* The BDB equipment for removing debris (tractors and front-end loader) will be protected from high temperature events while stored in the BDB Storage Building(s) to ensure equipment readiness at extreme temperatures when called upon.

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F6. Safety Functions Support (Accessibility)		
F6.2 - PWR Portable Equipment Phase 2		
F6.2.5 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Site accessibility is necessary for the successful deployment of BDB equipment to respond to an ELAP/LUHS event. Security procedures contain contingencies to provide access through site security barriers and debris removal equipment is available to clear travel pathways as needed.	*Identify modifications* No modifications are needed to support site accessibility for the implementation of the planned FLEX strategy.	*Identify how the connection is protected* The protection of connections is not applicable to the site accessibility strategy.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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F6. Safety Functions Support (Accessibility)

F6.3 - PWR Portable Equipment Phase 3

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

The potential impairments to required access are: 1) doors and gate barriers, and 2) site debris blocking personnel or equipment access. The coping strategy to maintain site accessibility through gates and doors is applicable to all phases of the FLEX strategy and is discussed in Section F6.1. Debris removal is addressed in the deployment of the on-site Phase 2 BDB equipment and is discussed in Section F6.2.

Phase 3 involves the receipt of equipment from offsite sources including the RRC and various commodities such as fuel and supplies. Transportation of these deliveries can be through airlift or via ground transportation. Debris removal for the pathway between the site and the RRC receiving location and from the various plant access routes may be required. The same debris removal equipment used for on-site pathways would be used. Evaluation and development of coordination with the RRC will be performed and document as described in Section A.9.

Details:

F6.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* The procedural guidance developed for Phase 2 will be applicable to debris removal activities in Phase 3.
F6.3.2 - Identify modifications	*List modifications necessary for phase 3.* No modifications to ensure site accessibility are planned.
F6.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* There are no key parameters associated with the site accessibility in any phase of the ELAP/LUHS response.

F6. Safety Functions Support (Accessibility)		
F6.3 - PWR Portable Equipment Phase 3		
F6.3.4 - Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
a. *Identify Strategy including how the equipment will be deployed to the point of use.* Site accessibility is necessary for the successful deployment of BDB equipment to respond to an ELAP/LUHS event. Security procedures contain contingencies to provide access through site security barriers and debris removal equipment is available to clear travel pathways as needed.	*Identify modifications.* No modifications are needed to support site accessibility for the implementation of the planned FLEX strategy.	*Identify how the connection is protected.* The protection of connections is not applicable to the site accessibility strategy.
Notes: The information provided in this section is based on the following reference(s): Engineering Technical Evaluation, ETE -CPR-2012-0008, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 0.		

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Table 1 - PWR Portable Equipment Phase 2[1] [Open Item 19]							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment[2]	Core	Containment **[Open Item 4]**	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
BDB High Capacity pump (2) and associated hoses and fittings	X		X			1200 gpm[4]	Will follow EPRI template requirements
BDB AFW pump (4) and associated hoses and fittings[8]	X					300 gpm[4]	Will follow EPRI template requirements
BDB RCS Injection pump (4) and associated hoses and fittings	X					40 gpm[4]	Will follow EPRI template requirements
120 VAC generators (4) and associated cables, connectors and switchgear (to re-power Instrumentation)				X		10 kW[5]	Will follow EPRI template requirements
120 VAC generators (4) and associated cables, connectors and switchgear (to provide support equipment) [3]					X	10 kW[5]	Will follow EPRI template requirements
480 VAC generators (2) and associated cables, connectors and switchgear (re-power battery chargers, inverters, and vital buses) [6]				X		300-350 kW[5]	Will follow EPRI template requirements
Cables for 4160 VAC generator connections (4 Sets)				X	X		
Portable boric acid batching tanks (4)	X						
Light plants (4) [3]					X		
Front end loader (2) [3]					X		

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Table 1 - PWR Portable Equipment Phase 2[1] [Open Item 19]							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment[2]	Core	Containment **[Open Item 4]**	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Tow vehicles – tractors (2) [3]					**X**		
Hose trailer or utility vehicle (2) [3]					**X**		
Fans / blowers/heaters (2 sets) [3]					**X**		
Air compressors (4) [3]					**X**		
Fuel carts with pump (2) [3]					**X**		
Communications Equipment (2 sets) [3,7]					**X**		
Misc. debris removal equip. (1 set) [3]					**X**		
Misc. Support Equipment (2 sets) [3]					**X**		

Notes:

1. The number of storage buildings and associated design requirements has not been determined **[Open Item 6]**. For the purposes of this table two storage buildings have been assumed.
2. Indicated quantities are station totals for both MPS2 and MPS3.
3. Support equipment. Not required to meet N+1.
4. Preliminary performance criteria. Final performance criteria will be determined by the hydraulic analysis performed in accordance with the design process. **[Open Item 5]**
5. Preliminary performance criteria. Final performance criteria will be determined by the electrical loading analysis performed in accordance with the design process. **[Open Item 13]**
6. 480 VAC generators are an alternate strategy to the 120/240 VAC generators. Therefore, only N are required.
7. Equipment purchase in response to the results of Recommendation 9.3 of the 10 CFR50.54(f) letter dated March 12, 2012.
8. MPS2 will have one of the BDB AFW pumps pre-staged in the upper levels of the Turbine Building.

Italicized text is part of the NEI standard template and is retained for information purposes.

Table 2 - PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
4160 VAC generators (2) and associated switchgear.				**X**	**X**	2.5-3 MW[1]	3

Notes:

1. Indicated quantities are station totals for both MPS2 and MPS3.
2. Preliminary performance criteria. Final performance criteria will be determined by the electrical loading analysis performed in accordance with the design process. **[Open Item 13]**

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Table 3 - Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	No radiation protection equipment from offsite (Phase 3) is anticipated.
Commodities • Food • Potable water	No food/water from offsite (Phase 3) is anticipated.
Fuel Requirements	An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed and will include Phase 3 equipment. The fuel strategy will evaluate the need for additional fuel required from the RRC or other offsite sources. **[Open Item 14]**
Heavy Equipment • **Transportation equipment** • **Debris clearing equipment**	From Table 1, transportation and debris clearing equipment is available onsite (Phase 2).

Attachment 1A
Sequence of Events Timeline

Action Item	Elapsed Time	Action	Time constraint Y/N	Remarks/Applicability
	0	Event Starts	NA	Plant @ 100% power
1	15 sec	TDAFW pump starts. Verify AFW flow established.	N	Original design basis for SBO event. 50 min to SG dryout. [a]
2	15 sec	SBO Procedures are entered	N	SBO event required response. [a]
3	15 min	Identification of Loss of All Power	N	SBO procedure will identify/verify this condition. [a]
4	15 min	Verify RCS Isolation	N	Establishes long term inventory in the RCS. [a]
5	45 min	ELAP/LUHS Declared	N/A	
6	50 min	Control SG atmospheric relief bypass valves and AFW flow	N	On-going action for cooldown and decay heat removal – operations personnel remain stationed locally. [a]
7	**75 min**	**DC load stripping completed**	**Y**	**Starts at 45 min and completed in 30 min to provide a battery life of 5 hr.**
8	**2 hrs**	**Throttle AFW flow to SGs**	**Y**	**2 hrs to SG overfill**
9	**2-5 hrs [b]**	**Repower 120V vital buses[c]**	**Y**	**Batteries depleted in 2-5 hours. [b]**
10	6 hrs	Augmented Staff Arrive on Site	N/A	Reference NEI 12-01
11	12-18 hrs	Deploy portable boric acid batching tank	N	Deployed if the RWST is not available.
12	**20.9 hrs**	**Deploy BDB High Capacity pump to Barge Slip and initiate flow from Long Island Sound**	**Y**	**Prior to depletion of DWST volume (20.9 hrs).**
13	12-24 hrs	Deploy BDB AFW pumps	N	BDB AFW pump is deployed in standby as a backup to the TDAFW pump.

Action Item	Elapsed Time	Action	Time constraint Y/N	Remarks/Applicability
14	**25 hrs**	**Deploy BDB RCS Injection pump and initiate RCS injection for RCS inventory make-up /reactivity control**	**Y**	**33 hrs* (RCS Inventory Make-up: to prevent loss of natural circulation) / Reactivity control: 25 hrs** ***Duration will be significantly longer following installation of low-leakage seals**
15	**50 hrs**	**Add inventory to SFP**	**Y**	**10 hours to boiling / 50 hours to water level at 10 ft. above fuel. This is an ongoing activity.**
16	**> 7 days**	**Reduce pressure and temperature in Containment**	**Y**	**Prior to temperature reaching EQ qualification.**

[a] Previously evaluated in response to 10 CFR50.63 and in accordance with existing procedures.

[b] An evaluation will determine the time to battery depletion based on load stripping activities **[Open Item 2]**.

[c] If the 480V generators are connected, the 120V generators are not needed for instrumentation.

Attachment 1B
NSSS Significant Reference Analysis Deviation Table

Item	Parameter of Interest	WCAP-17601 Value	WCAP-17601 Section	Plant Applied Value	Gap and Discussion
	Applicable computer code for NSSS analysis	NOTRUMP	Section 4.1.1.1	NOTRUMP	The Reference Plant Case in Section 5.2.1 is representative of MPS3.
	RCS leakage	1 gpm	Section 4.2.1	1 gpm	A value of 1 gpm unidentified leakage is appropriate given the effectiveness of the boric acid corrosion control programs at the plant.
	RCP leakage	21 gpm/RCP	Section 4.2.2 Section 4.4.1 Section 5.2.1 Table 5.2.2-1	<21 gpm/RCP	This value is used in deterministic analysis to show compliance with 10 CFR 50.63 (SBO) as stated in Section 4.4.1 of WCAP-17601. Dominion has committed to replacement of the original RCP seals with low-leakage seals at MPS-3. However, only two of the four RCP seals will be replaced at MPS-3 by the second outage following February 28, 2013. Implementation of the Flowserve N-9000 seals at MPS-3 will considerably lengthen the time to loss of natural circulation and core uncover from the Reference Plant Case.
	Number of SGs used to establish natural circulation	Four - Symmetric	Section 4.1.1.1 Section 4.2.1	Four - Symmetric	The Reference Plant Case in Section 5.2.1 is representative of MPS-3.
	Total Turbine Driven AFW flow	Adequate to establish and maintain NR level	Section 4.2.1 Section 5.2.1 Table 5.2.2-1	Minimum available is 743 gpm @ 1250 psia to four SGs	Adequate to establish and maintain NR level
	Start Cooldown and cooldown rate	2 hours @ 70F/hr	Section 5.2.1 Table 5.2.2-1	2 hours @ < 100F/hr to a SG pressure of 290 psig	The Reference Plant Case in Section 5.2.1 is representative of MPS-3. The minimum SG pressure is consistent with the existing EOP setpoint to prevent safety injection accumulator nitrogen gas from entering the RCS.

`Attachment 2A
Milestone Schedule
Millstone Power Station – MPS3- Full Compliance Date: November 2014

TASK	Feb-13	Mar-13	Apr-13	May-13	June 13	July-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	June-14	July-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	June-15	July-15	Aug-15	Sep-15	Oct-15	Nov-15
6-month Status Update																																		
Submit Integrated Plan																																		
Develop Strategies																																		
Develop Modifications																																		
Implement Modifications																																		
Develop Training Plan																																		
Implement Training																																		
Issue FSGs and Associated Procedure Revisions																																		
Develop Strategies / Contract with RRC																																		
Purchase Equipment																																		
Procure Equipment																																		
Create Maintenance Procedures																																		
Outage Implementation																																		

Attachment 2B
Open Items

Open Item #	Description	Completion Schedule[1]
1	Verify response times listed in timeline and perform staffing assessment.	June 2014
2	Evaluation of extended battery life with load stripping of all non-essential loads.	June 2013
3	Preliminary analyses have been performed to determine the time to steam generator overfill without operator action to reduce AFW flow, time to steam generator dryout without AFW flow, and time to depletion of the useable volume of the DWST. The final durations will be provided when the analyses are completed.	June, 2013
4	The Phase 3 coping strategy to maintain containment integrity is under development. Methods to monitor and evaluate containment conditions and depressurize/cool containment, if necessary, will be provided in a future update.	December 2013
5	Analyses will be performed to develop fluid components performance requirements and confirm fluid hydraulic-related strategy objectives can be met.	September 2013
6	A study is in progress to determine the design features, site location(s), and number of BDB Storage Building(s). The final design for BDB Storage Building(s) will be based on the guidance contained in NEI 12-06, Section 11.3, Equipment Storage. A supplement to this submittal will be provided with the results of the equipment storage study.	June 2013
7	FSGs will be developed in accordance with PWROG guidance. Existing procedures will be revised as necessary to implement FSGs.	See Milestone Schedule

Open Item #	Description	Completion Schedule[1]
8	EPRI guidance documents will be used to develop periodic testing and preventative maintenance procedures for BDB equipment. Procedures will be developed to manage unavailability of equipment such that risk to mitigating strategy capability is minimized.	September 2014
9	An overall program document will be developed to maintain the FLEX strategies and their bases, and provide configuration control and change management for the FLEX Program.	September 2014
10	The Dominion Nuclear Training Program will be revised to assure personnel proficiency in the mitigation of BDB events is developed and maintained. These programs and controls will be developed and implemented in accordance with the SAT.	September 2014
11	Complete the evaluation of TDAFW pump long term operation with ≤ 290 psig inlet steam pressure.	December 2013
12	Plant modifications will be completed for permanent plant changes required for implementation of FLEX strategies.	See Milestone Schedule
13	Analyses will be performed to develop electrical components performance requirements and confirm electrical loading-related strategy objectives can be met.	September 2013
14	An evaluation of all BDB equipment fuel consumption and required re-fill strategies will be developed.	June 2014
15	A lighting study will be performed to validate the adequacy of supplemental lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions.	June 2014
16	A comprehensive communications study will be performed in accordance with the commitments made in response to Recommendation 9.3 of the 10 CFR 50.54(f) letter dated March 12, 2012 in Dominion letter S/N 12-205F dated October 29, 2012.	Consistent with Recommendation 9.3 Commitment Dates

Open Item #	Description	Completion Schedule[1]
17	Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date.	September 2013
18	Preferred travel pathways will be determined using the guidance contained in NEI 12-06. The pathways will attempt to avoid areas with trees, power lines, and other potential obstructions and will consider the potential for soil liquefaction.	June 2014
19	The equipment listed in Table 1 will be procured.	June 2014
NOTES: 1. The completion status of open items, or any necessary changes to the completion schedule dates, will be provided in the planned 6-month status reports submitted in accordance with Order EA-12-049, Condition C.2.		

Attachment 3
Conceptual Sketches
(10 Pages)

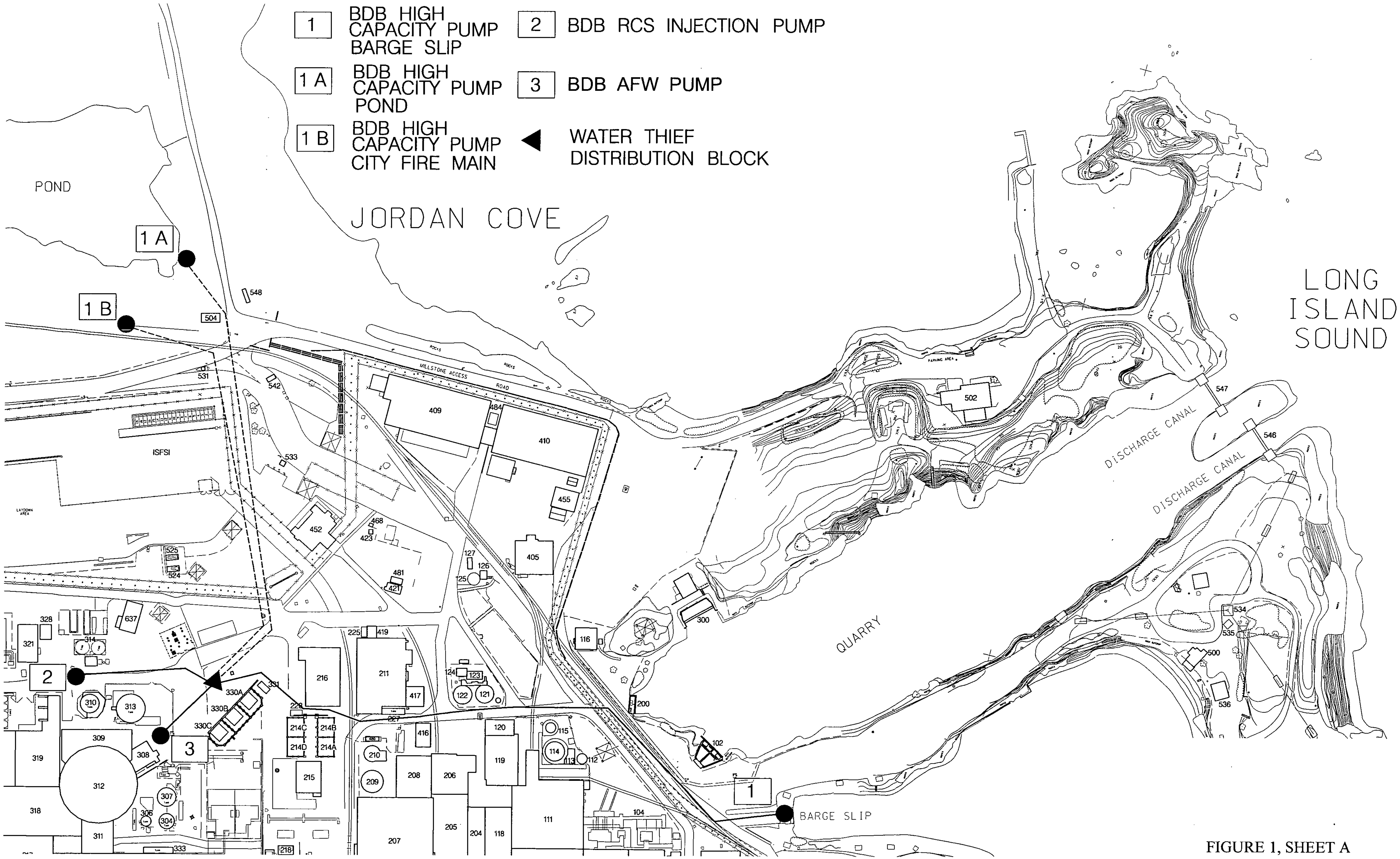

FIGURE 1, SHEET A
BDB MECHANICAL EQUIPMENT AND HOSE LAYOUT
MILLSTONE UNIT 3

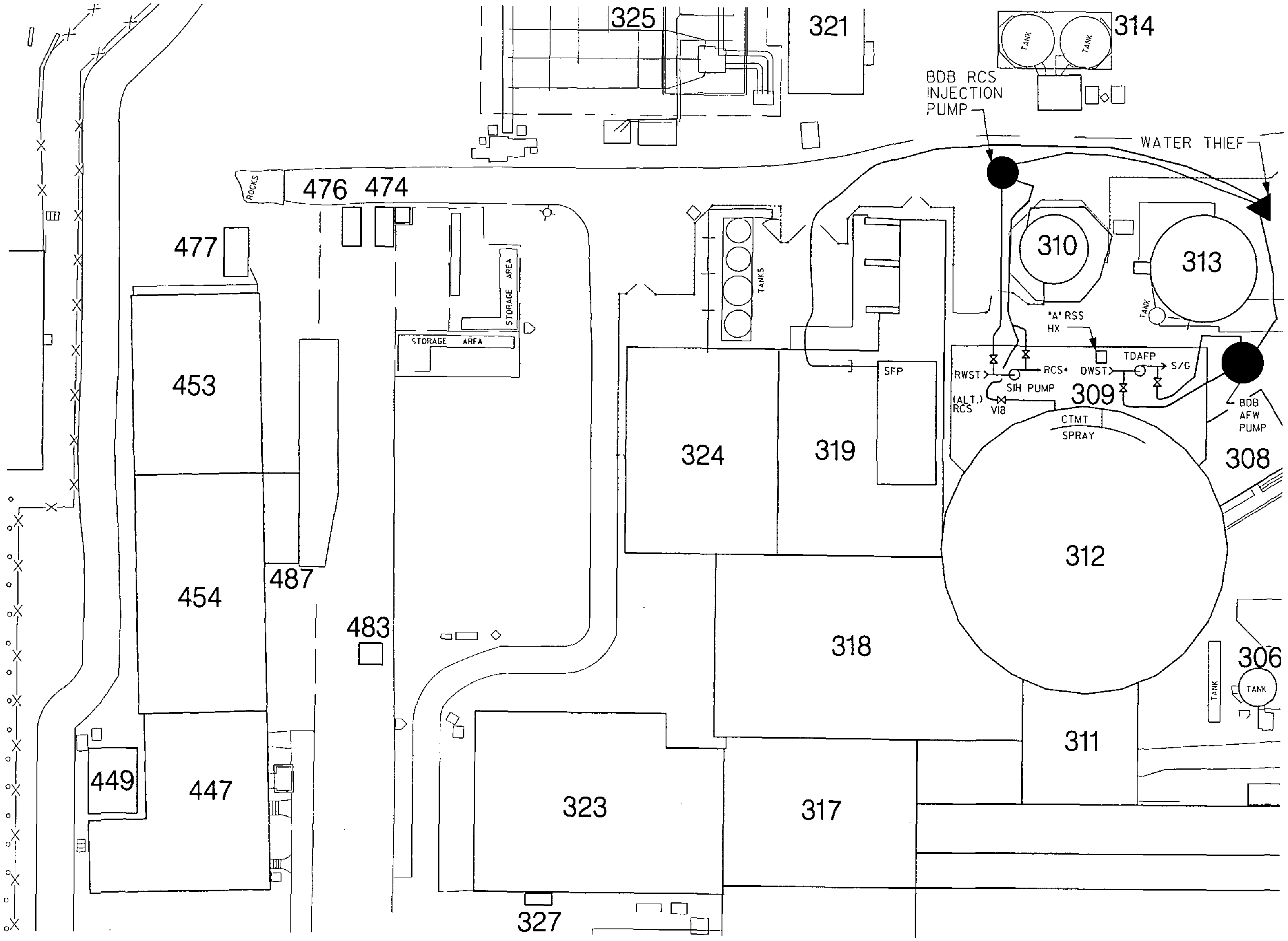

FIGURE 1, SHEET B
BDB MECAHNICAL EQUIPMENT AND HOSE LAYOUT (ENLARGED VIEW)
MILLSTONE UNIT 3

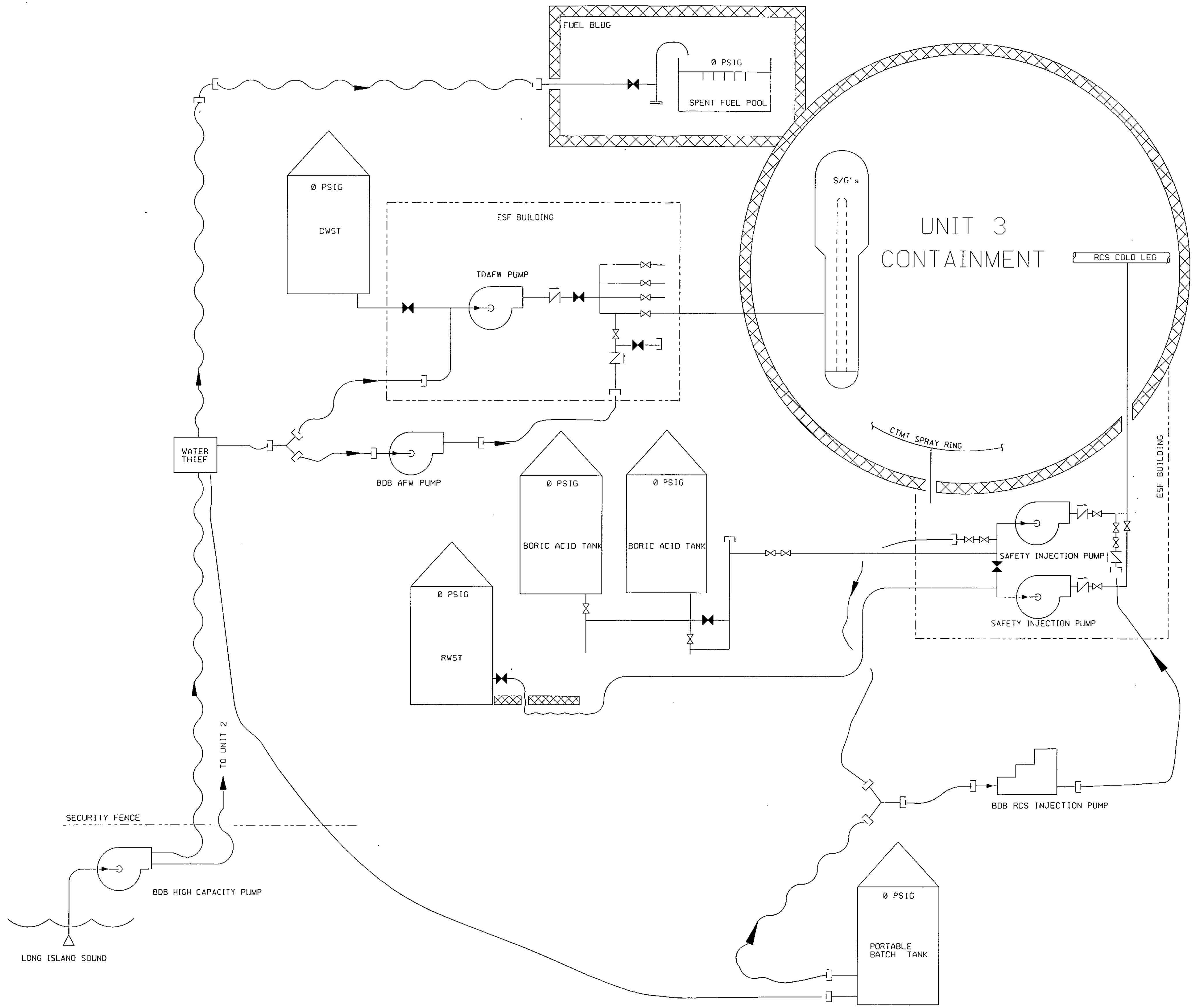

FIGURE 2
BDB FLEX STRATEGY
PRIMARY MECHANICAL CONNECTIONS
FLOW DIAGRAM
MILLSTONE UNIT 3

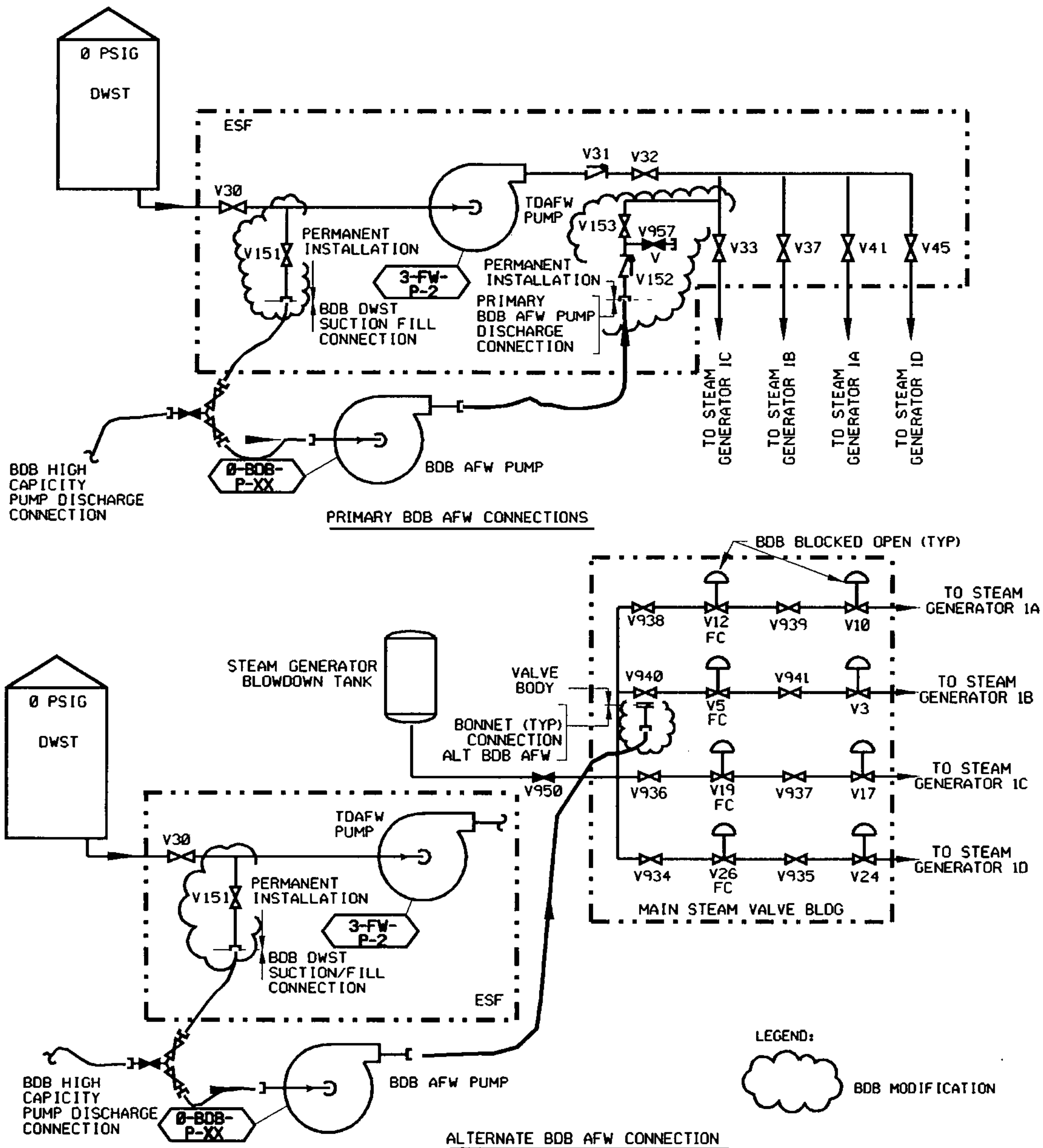

FIGURE 3
CORE COOLING AND DECAY HEAT REMOVAL
-PRIMARY AND ALTERNATE MECHANICAL CONNECTIONS-
MILLSTONE UNIT 3

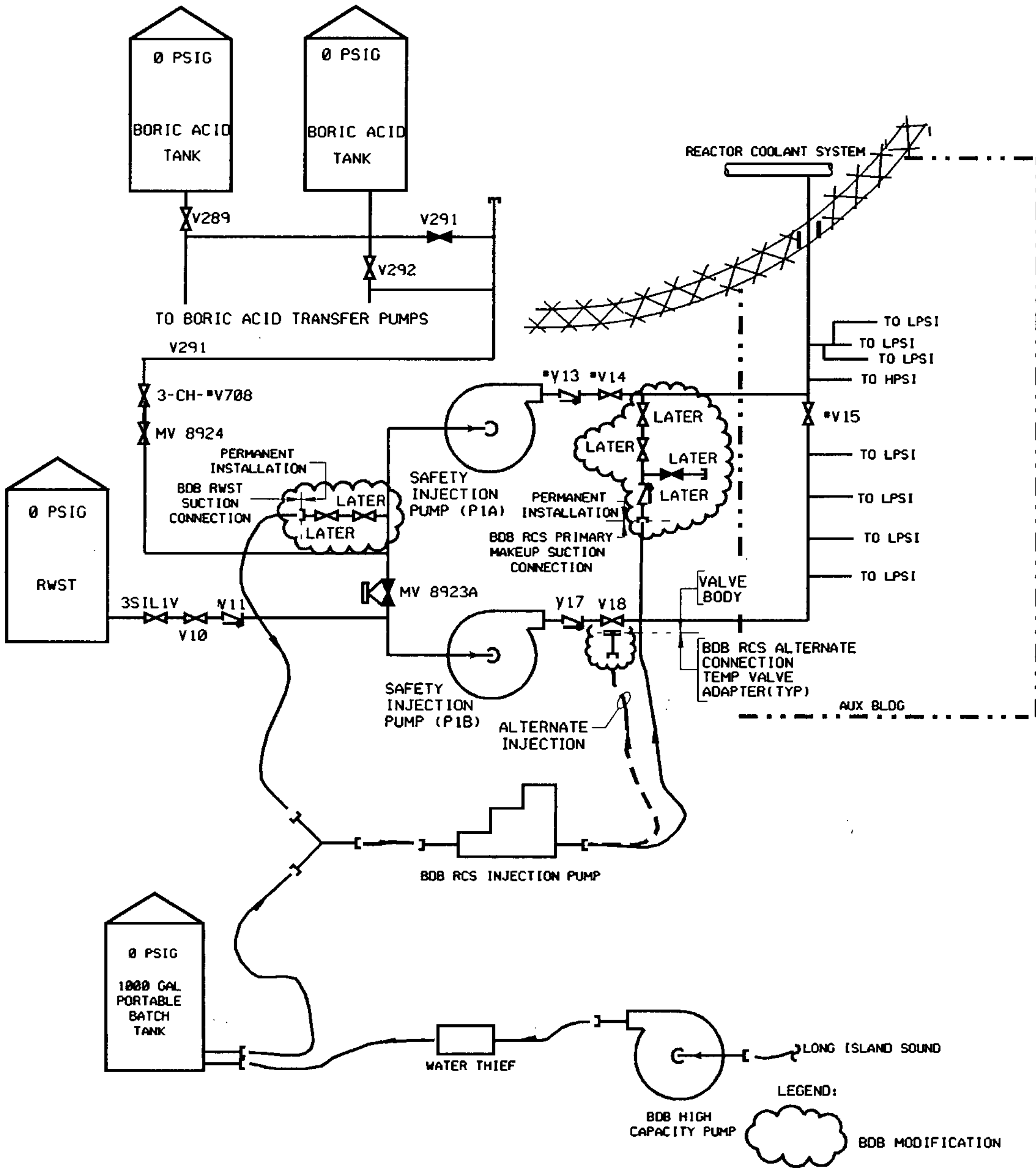

FIGURE 4
RCS INVENTORY AND REACTIVITY CONTROL MAKEUP
-PRIMARY AND ALTERNATE MECHANICAL CONNECTIONS-
MILLSTONE UNIT 3

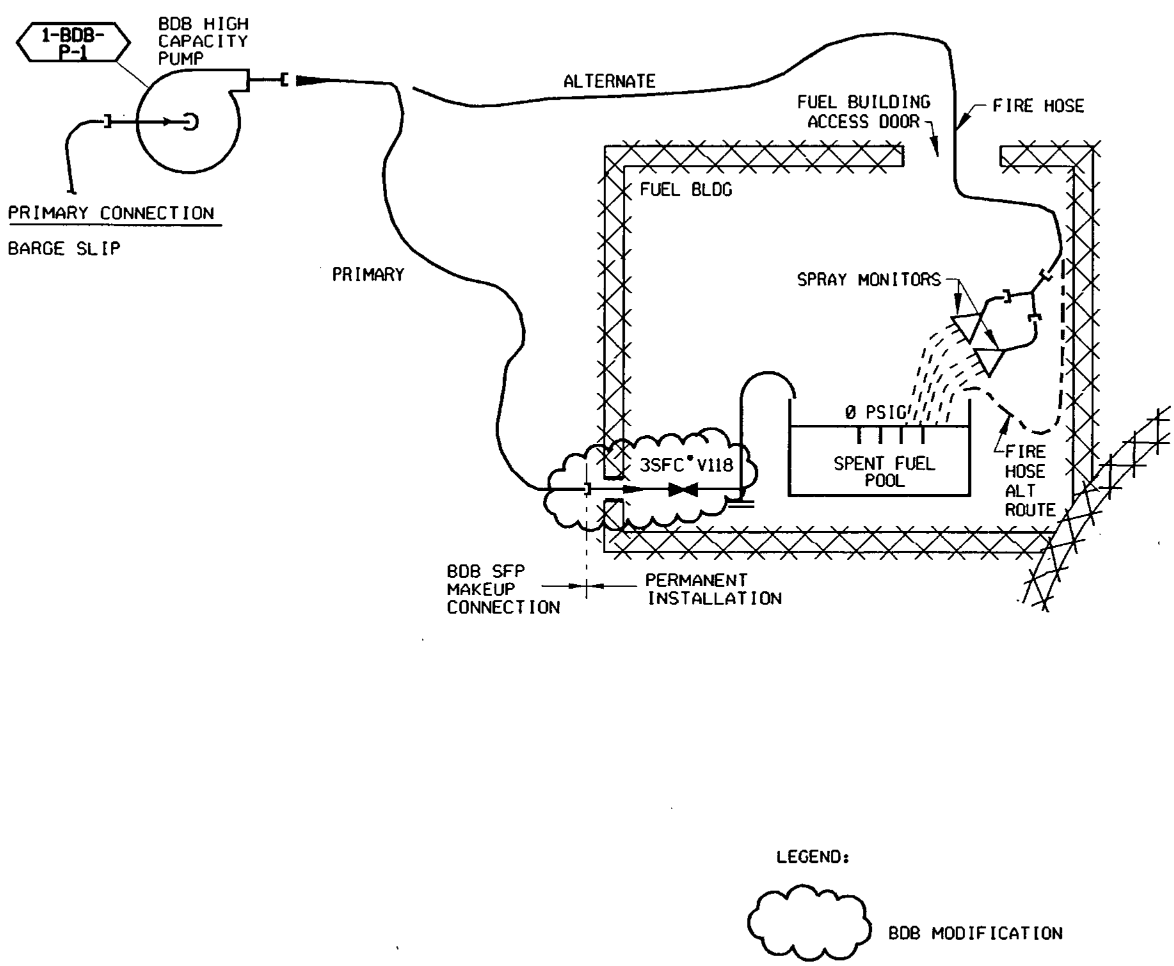

FIGURE 5
SPENT FUEL POOL COOLING
-BDB FLEX PRIMARY AND ALTERNATE MECHANICAL CONNECTIONS-
MILLSTONE UNIT 3

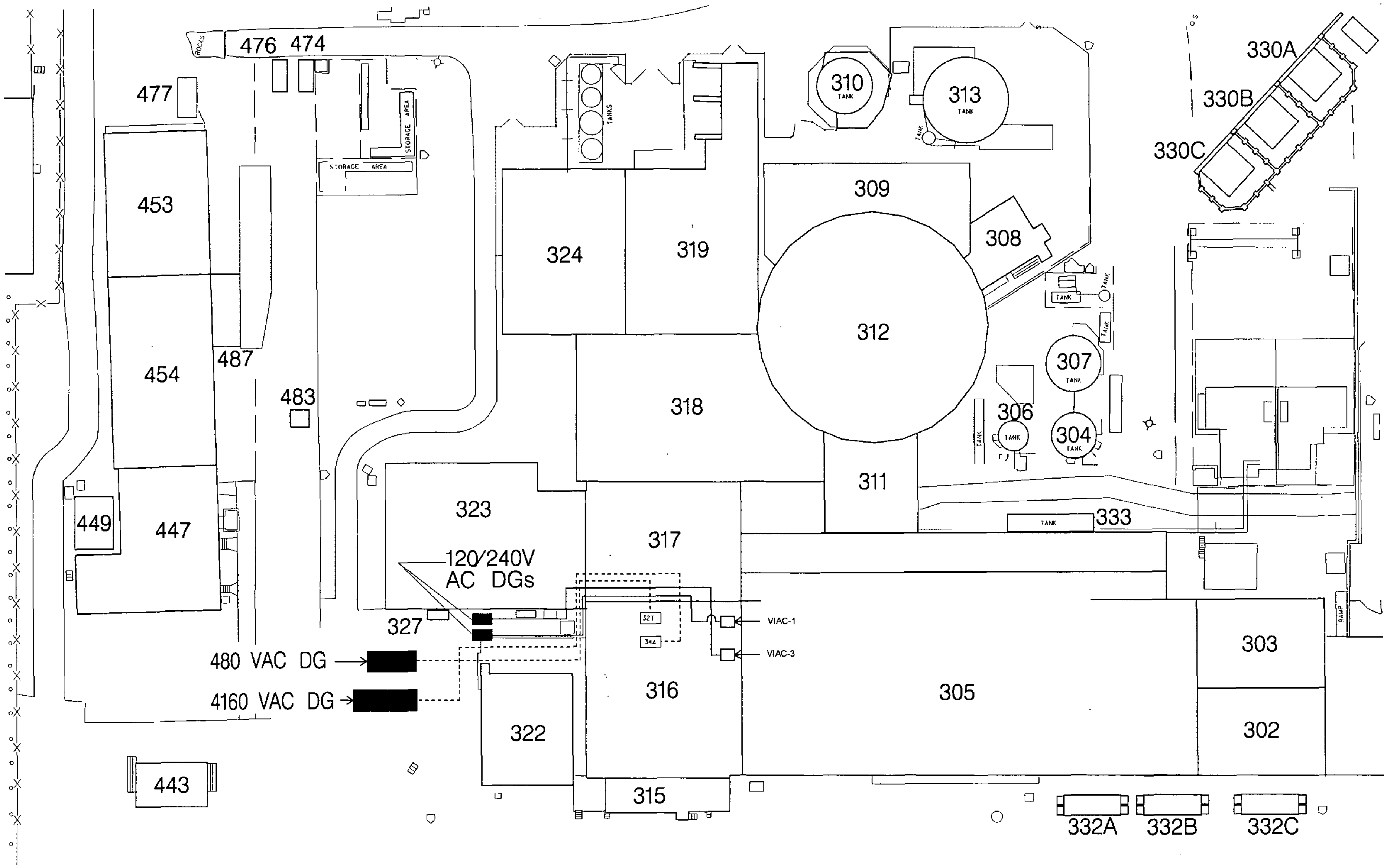

FIGURE 6
BDB ELECTRICAL GENERATOR DEPLOYMENT LAYOUT
MILLSTONE UNIT 3

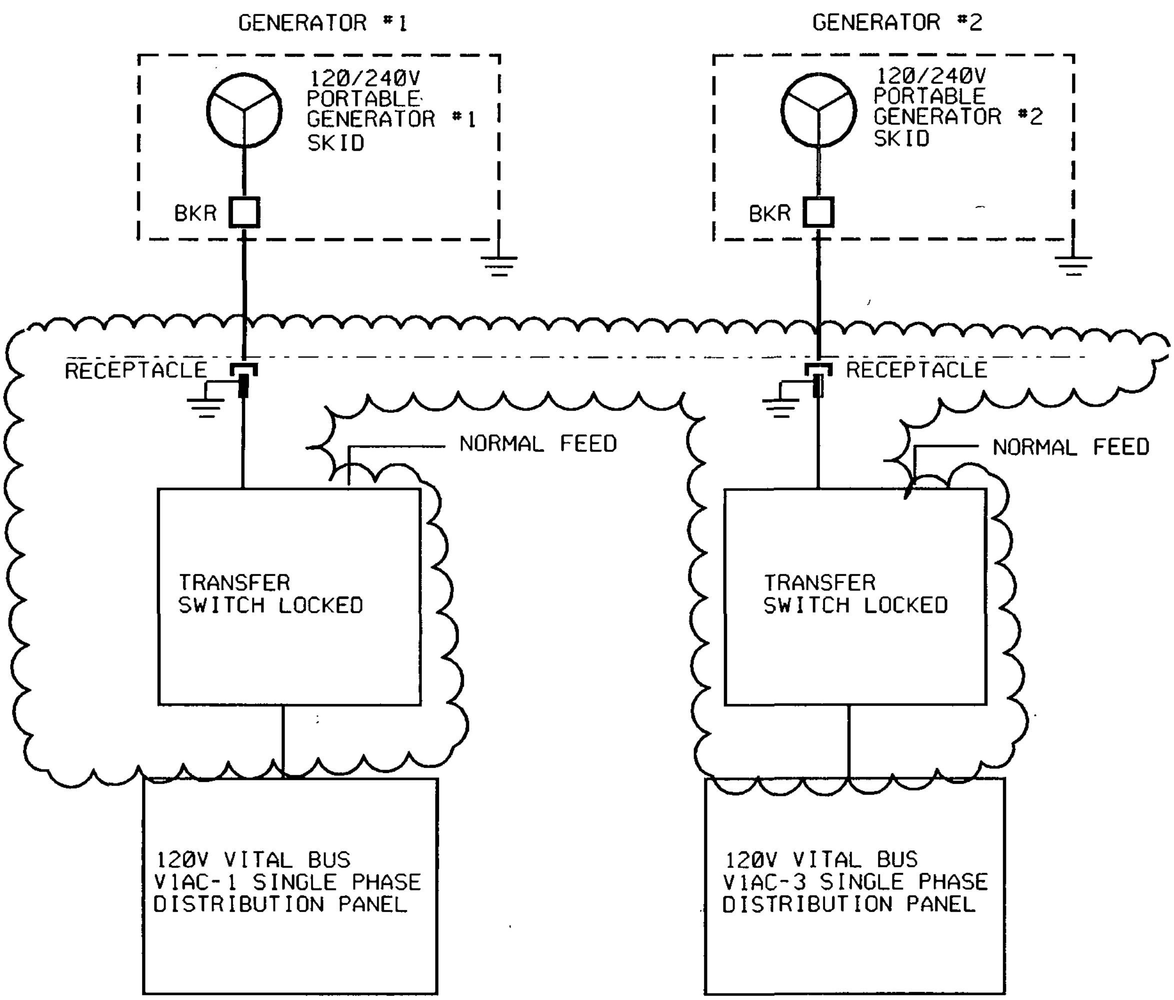

FIGURE 7
120/240 VAC GENERATOR ELECTRICAL CONNECTIONS
MILLSTONE UNIT 3

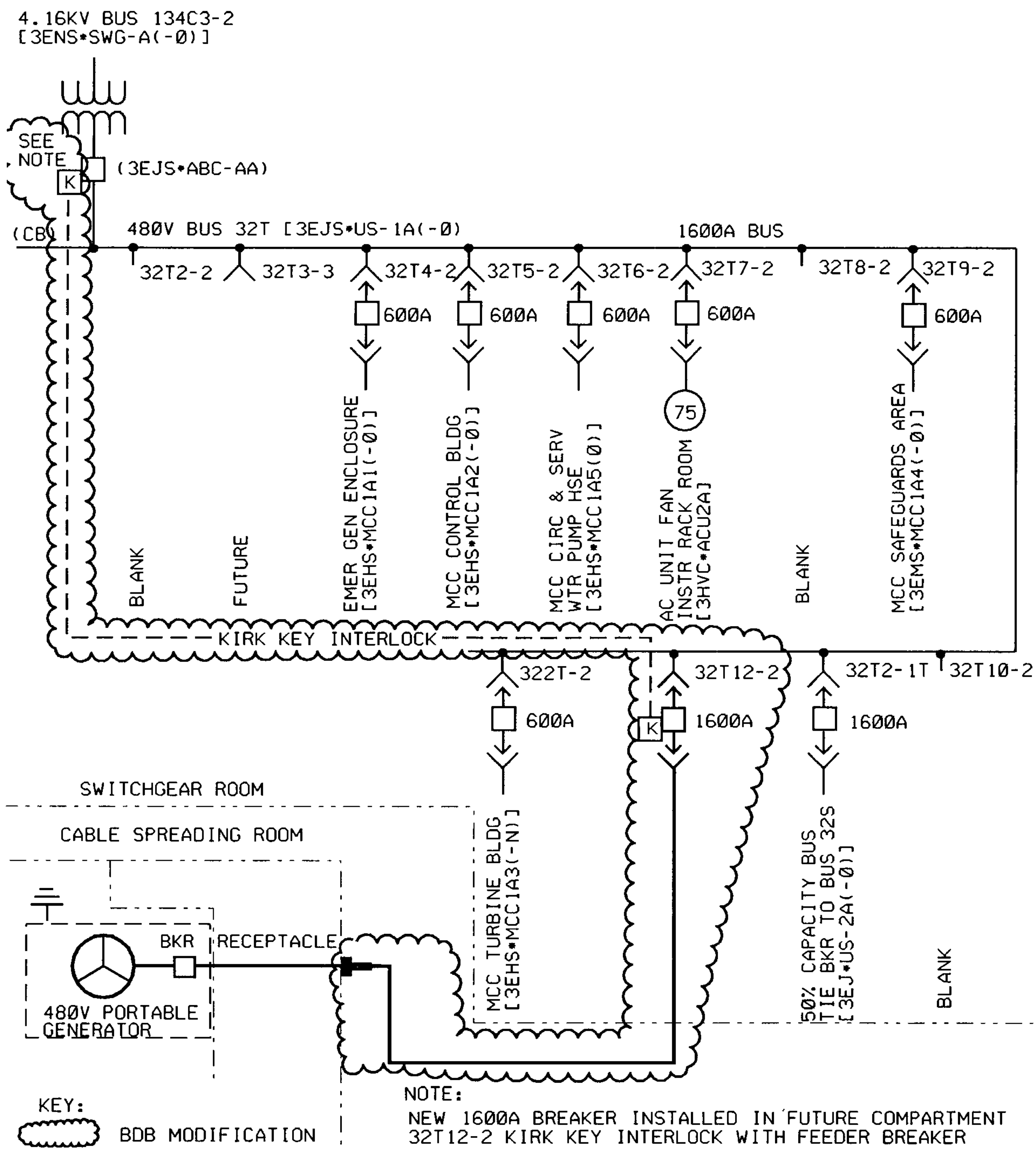

FIGURE 8
480 VAC GENERATOR ELECTRICAL CONNECTIONS
MILLSTONE UNIT 3

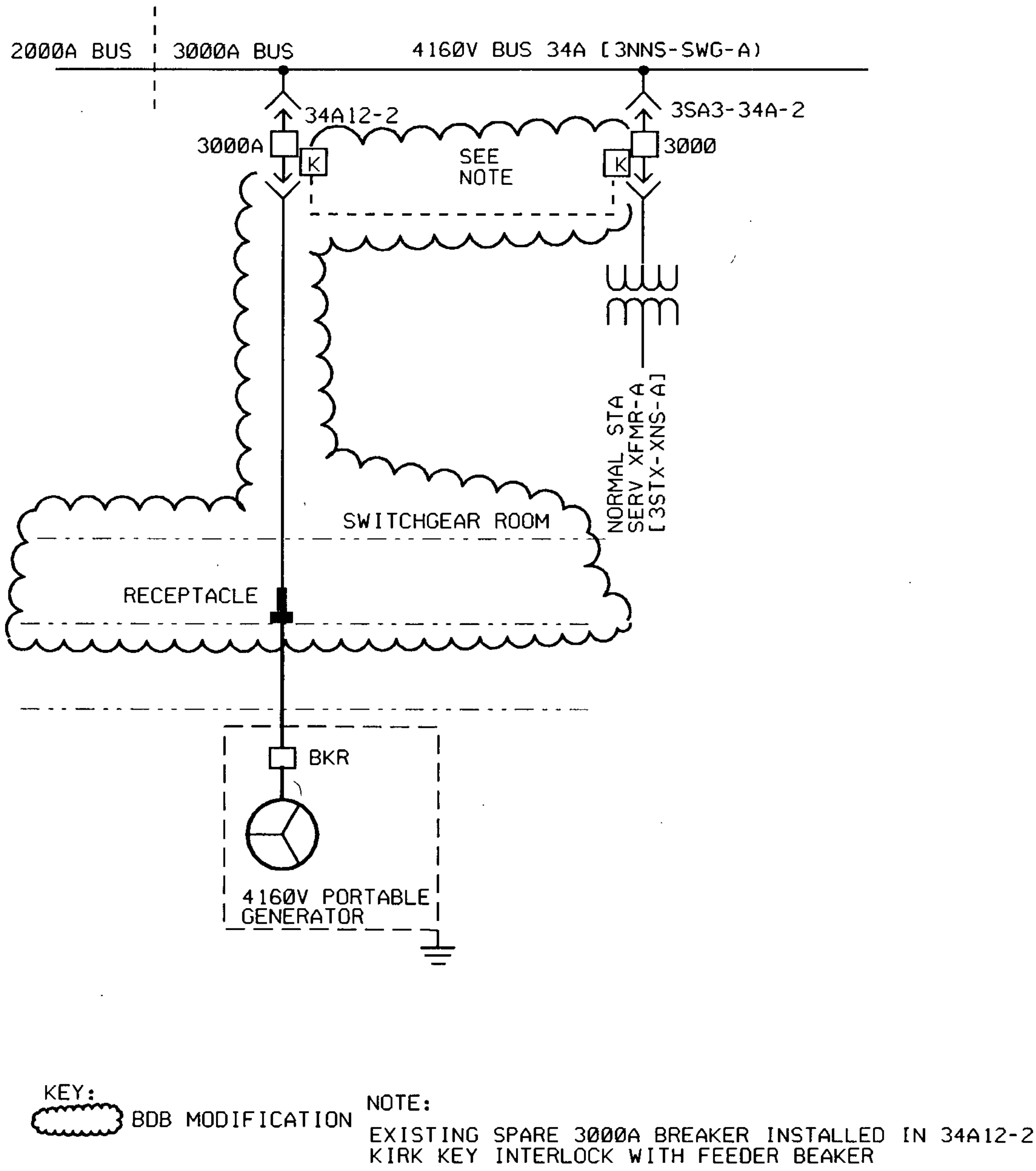

FIGURE 9
4160 VAC GENERATOR ELECTRICAL CONNECTIONS
MILLSTONE UNIT 3