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Dominion®

10 CFR 2.202
EA-12-049

February 28, 2013

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

Serial No.: 12-160B
NL&OS/MAE: R3
Docket No.: 50-305
License No.: DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
OVERALL INTEGRATED PLAN IN RESPONSE TO MARCH 12, 2012 COMMISSION ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS (ORDER NUMBER EA-12-049)

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. Dominion Energy Kewaunee, 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. 12-160A)

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Dominion Energy Kewaunee, Inc. (DEK). Reference 1 was immediately effective and directs DEK 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. Reference 3 provided the DEK initial status report regarding mitigation strategies, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. The enclosed Integrated Plan is based on conceptual design information. Final design details and associated procedure guidance, as well as any revisions to the information contained in the enclosure, will be provided in the 6-month Integrated Plan updates required by Reference 1.

On February 25, 2013, DEK submitted a letter to the NRC certifying that it has decided to permanently cease power operation of Kewaunee Power Station (KPS) on May 7, 2013 (Serial

A151
NRR

No. 13-107). Therefore, DEK intends to seek relief from appropriate portions of the Order consistent with Section IV of the Order.

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

Sincerely,

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

Enclosure

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 Energy Kewaunee, 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
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My Commission Expires May 31, 2014

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NRC Senior Resident Inspector
Kewaunee Power Station

Serial No. 12-160B
Docket No. 50-305
Order EA-12-049

Enclosure

Kewaunee Overall Integrated Plan

Mitigation Strategies For Beyond-Design-Basis External Events

Kewaunee Power Station (KPS)

Dominion Energy Kewaunee, Inc. (DEK)

Kewaunee Overall Integrated Plan Mitigation Strategies for Beyond-Design-Basis External Events

I. Introduction

Overview

The Nuclear Regulatory Commission (NRC) issued Order EA-12-049, *Issuance of Order to Modify Licenses with Regard to Mitigation Strategies for Beyond-Design-Basis External Events*, on March 12, 2012. The Order requires licenses to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities in the event of a beyond-design-basis external event (BDBEE). The Order also requires that an overall integrated plan that provides a description of how the requirements of the Order will be achieved.

NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,"* provides an approach for complying with Order EA-12-049. NRC Interim Staff Guidance JLD-ISG-2012-01, *Order Modifying Licenses with Regard to Mitigation Strategies for Beyond-Design-Basis External Events*, considers that the methodologies and guidance in conformance with the guidelines provided in NEI 12-06, Revision 0, subject to the clarifications and exceptions specific to Section 2.1, Initial Response Phase, and Section 6.2, Equipment Quality, are an acceptable means of meeting the requirements of Order EA-12-049.

Status of Kewaunee Power Station Operation

On February 25, 2013, DEK submitted a letter to the NRC certifying that it has decided to permanently cease power operation of KPS on May 7, 2013 (Serial No. 13-107). Therefore, DEK intends to seek relief from applicable portions of the Order consistent with Section IV of the Order. Upon completion of reactor defueling activities, spent nuclear fuel on site will be located either in the SFP[1] or in dry storage at the onsite Independent Spent Fuel Storage Installation (ISFSI). DEK currently plans to submit a certification of permanent fuel removal from the reactor in the second quarter of 2013 to formalize the possession-only status of the plant.

This decision to permanently shut down and defuel the KPS reactor affects DEK's approach to compliance with Order EA 12-049 because the plant will have been permanently shut down and defueled by the time the mitigation strategies and equipment could reasonably be expected to be put in place. After permanent shutdown,

[1] KPS stores spent fuel in storage racks in the spent fuel pool, the adjacent cask pool, and in a modified section of the transfer canal, all of which are connected by normally-open fuel transfer gates. Hereafter, the term "spent fuel pool" refers to all three pools together.

a BDBEE that involves core cooling and containment integrity is no longer relevant. Responding to the safety of the spent fuel in the SFP will be the primary safety focus of the responders.

DEK understands that because the KPS reactor continues to operate at this time, an overall integrated plan must be provided, consistent with Order EA 12-049. However, in light of the plan to permanently cease plant operation in 2013, DEK's approach to compliance with Order EA 12-049 as it pertains to core cooling (including Reactor Coolant System (RCS) inventory control) and containment cooling is provided in a more generalized fashion, in anticipation of these functions no longer being required for a plant that has permanently ceased power operation. The BDBEE mitigation strategies for core cooling, RCS inventory control, and containment are not expected to be implemented at KPS. Furthermore, the proposed method of compliance for ensuring SFP cooling after a BDBEE reflects a more simplified approach than the NEI guidance suggests because of the extended times available for action due to a lower and decaying heat load in the SFP because of the absence of continued operating reactor off-loads.

The high-level summary discussion of BDBEE mitigation strategies for core cooling, RCS inventory control, and containment reflect the state of the conceptual design strategies at KPS at the time of the plant shutdown announcement. At that time, conceptual designs, preliminary piping and instrumentation diagrams (P&IDs), preliminary electrical schematics, and walkdowns to identify tie-in connection points had been completed, but detailed design work and specifications for equipment had not been completed. For SFP cooling, the design work for implementing the BDBEE mitigation strategy is being integrated with the design work to reduce the nuclear island in anticipation of placing the plant in a SAFSTOR condition for decommissioning.

In summary, the following integrated plan provides the KPS approach for complying with Order EA-12-049 using the guidance in NEI 12-06, for power operation and as affected by the decision to permanently cease power operation in 2013. The "power operation" discussion of the mitigation strategies for core cooling, RCS inventory control, containment, and SFP cooling are at a high level and reflect the conceptual design information. The spent fuel pool cooling mitigation strategy for the "possession-only" status of KPS is different than the strategy for power operation and is provided at a greater level of detail. The SFP cooling mitigation strategy will be revised, as appropriate, as detailed design engineering proceeds in concert with decommissioning planning. Consistent with the requirements of Order EA-12-049 and the guidance in NEI 12-06, KPS six-month reports will delineate progress made, any proposed changes in KPS compliance methods, updates to the schedule, and if needed, requests for relief and the bases.

A. General Integrated Plan Elements

NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, BDBEE mitigation strategies for core cooling, RCS inventory control, and containment will not be required. However, because the plant continues to operate at this time, a high-level discussion of the concepts for these mitigation strategies is provided in Section A of the plan, to the extent the strategies were developed at the time the decision to permanently cease power operation at KPS was made. Thus, the mitigation strategies for core cooling, RCS inventory control and containment are for information only and will not be implemented at KPS. The mitigation strategy for spent fuel pool cooling will be implemented as long as spent fuel remains in the spent fuel pool.

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 hazards evaluated for the KPS site include: • Seismic • External flooding • Storms with high winds • Snow, ice, and low temperature • Extreme high temperature Each hazard is summarized below for KPS: Seismic The design criteria for seismic events are listed below. The operational basis and design basis earthquakes are applicable to Class 1 and Class 1* loads. The uniform building code earthquake is applicable to Class II and Class III* loads. The definition of nuclear safety design classifications is given in KPS USAR Section B.2.1. • Operational Basis Earthquake (OBE) - The Operational Basis Earthquake is based upon a maximum vertical ground acceleration of 0.04g and a maximum horizontal ground acceleration of 0.06g and the response spectra provided in KPS USAR Appendix A, Plate 8-A, "Recommended Response

	Spectra." • Design Basis Earthquake (DBE) - The Design Basis Earthquake is based upon a maximum horizontal ground acceleration of 0.12g and the response spectra given on Plate 8-B in KPS USAR Appendix A. It is also referred to as the Maximum Credible Earthquake (MCE) or the Safe Shutdown Earthquake (SSE). • Uniform Building Code Earthquake Loads - The seismic loads for this category are in accordance with the requirements of the Uniform Building Code. This code specifies the location of the plant site to be in a "Zero" earthquake area. However, for conservatism, earthquake loads applicable to Zone 1 areas were used in the design under this category. <u>External Flooding</u> There are no large rivers or streams in the vicinity of the KPS site, nor are there any nearby dams, the failure of which could cause a beyond-design-basis flooding event. The major part of the site is 20 feet or more above the normal lake level, and there is no record that it was flooded by the lake at any time. The small stream directly south of the plant is one of several drainage channels lying in the immediate vicinity of the plant, that drain storm water from a high ridge located some 7,000 feet west into Lake Michigan. The close proximity of these drainage channels and their associated drainage areas relieves the total maximum floodwater flow to the plant drainage channel. The site's design basis flood level was established based on expected lake levels. Tsunamis are not a threat to the northwestern shore of Lake Michigan based on the geologic and climatic characteristics of this region of the country. A one-hundred year hourly rainfall intensity of 2.5 inches per hour from U.S. weather bureau standards compares favorably with historical records for the greatest hourly rainfall on record for the Green Bay, Wisconsin area. A re-examination of the probable maximum precipitation event for the Independent Plant Examination for External Events (IPEEE) assumed a rainfall rate of 16.5 inches per hour and found the site drainage capability to still be adequate. The maximum probable water levels that can occur in the open forebay under the most adverse weather conditions

	either from pump-trip upsurge (585.5 feet) or from maximum wave run-up (585.4 feet) are below the floor level (586.0 feet) of the service water pump room and access tunnel. The only flood water access to the circulating pump room is from this floor level. Hence, none of these areas are subject to flooding. Based on the improbability of flooding from rain and the height of the safety equipment above the maximum lake water level (585.5 feet), it was concluded that flooding is not a problem. The Kewaunee USAR notes that the Atomic Energy Commission (AEC) had independently calculated the maximum lake level for Kewaunee to be 589.9 feet (due to seiche). As a result, the Kewaunee Screenhouse was modified during original construction. These modifications, including two bulkhead type doors on exterior access doors to the screenhouse, are detailed in Section 2.6.2 of the USAR. With these modifications, the plant can withstand lake levels up to elevation 605 feet. <u>Storms with High Winds</u> The KPS site and Lake Michigan are not located in a tropical or semi-tropical location where hurricanes form, and the area is sufficiently far away from the east coast that hurricanes making landfall there will not reach the KPS site with any significant intensity. Tornadoes and ice storms can occur, but are not common. All KPS structures are designed to withstand a wind load of 100 MPH. Class 1 structures are designed to withstand the wind loads from a tornado. The tornado model used for design purposes has a 300 mph rotational velocity and a 60 mph translational velocity (USAR Section B.4.2). <u>Snow, Ice, and Low Temperature</u> Snow storms and low temperatures are common and relatively severe at KPS in the winter. Structures are designed to withstand the maximum snow/ice load and low temperatures typical for the region. <u>Extreme High Temperature</u> Extreme high temperatures are infrequent, but do occur occasionally. Structures are designed to withstand extreme high temperatures typical for the region.
A.2 - Key Site assumptions to implement NEI 12-06	*Provide key assumptions associated with implementation of*

strategies. **Ref: NEI 12-06 section 3.2.1**	*FLEX Strategies:* • *Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes.* • *Exceptions for the site security plan or other (license/site specific) requirements of 10CFR may be required.* • *Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours.* • *Certain Technical Specifications cannot be complied with during FLEX implementation.* I. Assumptions for Power Operation For the high-level discussion of mitigation strategies developed prior to the plant shutdown announcement, the following assumptions were used. These assumptions were used in the initial evaluation and conceptual design efforts to develop BDBEE mitigation strategies to maintain core cooling, RCS inventory control, containment, and spent fuel pool cooling. • Plant operating at 100% thermal power for 100 days (1772 MWt) • SFP is at best estimate heat load and inventory loss from seismically-induced SFP water sloshing does not preclude access to the SFP area • Plant at minimum required operating staff • All system pressures and temperatures within normal operating ranges • No significant annunciator responses in progress • Turbine-driven auxiliary feedwater pump is operable and associated flows paths to both steam generators available • Two trains of station batteries, DC distribution systems, and inverters are available • All DC or inverter-powered instrumentation is available • Concurrent plant trip, loss of all AC power, and loss of ultimate heat sink • All control rods fully insert • Pressure-operated safety relief valves operate as-designed • No independent failures, other than those causing

	the Extended Loss of AC Power/Loss of Ultimate Heat Sink (ELAP/LUHS) event are assumed to occur during the course of the transient • Neither of the two condensate storage tanks (CSTs) are available • RCS letdown isolates due to the fail-closed design of air-operated letdown isolation valve • Reactor Coolant Pump (RCP) pump seal leakage is the only source of RCS inventory loss • Spent fuel pool level is at the normal administrative control band of 2'-2" to 3'-4" below the operating deck • Offsite personnel are assumed to begin arriving at hour 6 and fully staffed by 24 hours II. Assumptions for Possession-Only License Period After permanent plant shutdown and defueling, the following assumptions are used for the BDBEE mitigation strategy to maintain SFP cooling: • SFP contains a full core discharge, decayed 12 months, producing a calculated time to reach 200°F of 113 hours (see Attachment 3 curve). Inventory loss from seismically-induced SFP water sloshing does not preclude access to the SFP area • Spent fuel pool level is at the normal administrative control band of 2'-2" to 3'-4" below the operating deck • Plant at minimum required operating staff • SFP cooling system pressure and temperature within normal operating parameters • Loss of all AC power and loss of ultimate heat sink • SFP temperature is 80°F • No independent failures other than those causing the ELAP/LUHS event are assumed to occur during the course of the transient • Offsite personnel are assumed to begin arriving at hour 6 and fully staffed by 24 hours • Technical Support Center diesel-generator fuel tank is filled to nominal volume of 2,000 gallons
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-	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* I. Power Operation

01 and NEI 12-06. **Ref: JLD-ISG-2012-01** **NEI 12-06 13.1**	For the high-level discussion of power-operation BDBEE mitigation strategies for core cooling, RCS inventory control, containment, and SFP cooling, the NEI guidance is followed without exception. II. Possession-Only License Period For the possession-only license period, there is no mitigation strategy provided for core cooling, RCS inventory control, or containment. For SFP cooling, several exceptions from the guidance are taken to reflect the fact that SFP cooling will be the only safety function to be maintained. The exceptions include: • N+1 requirement will be met with one piece of equipment on site and a redundant piece of equipment available from another unaffected Dominion power station, if required • Existing plant structures will be used for storage
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 1* *See attached sequence of events timeline (Attachment 1).* I. Power Operation Refer to the "Power Operation" figure in Attachment 3 for a schematic depiction of the mechanical system configuration and proposed plant modifications. A. Core Cooling • At T=0, the plant trips, all AC power and access to the ultimate heat sink (Lake Michigan) are lost, and all non-seismically qualified or non-missile protected equipment is unavailable, which includes both Condensate Storage Tanks (CSTs). Thus, no water source for auxiliary feedwater to makeup to the steam generators (S/Gs) is available

	• From T=0 to T=1 hour, normal operating water inventory is available in the S/Gs to maintain RCS heat removal with the RCS on natural circulation and local manual operation of the main steam system steam relief valves (i.e., the S/G power-operated relief valves, or S/G-PORVs). S/G level gradually drops as inventory boils off during this time • Within the first hour, a water source is established from the Refueling Water Storage Tank (RWST) to the suction of the turbine-driven auxiliary feedwater pump (AFWP) via a new permanent, hard-piped flow path. Operators open the normally closed manual isolation valves in the line. After the RWST inventory is made available to the turbine-driven AFWP suction, discharge cross-connect valves in the AFW system are opened and the steam supply to the turbine that drives the AFWP is established. Initial makeup flow to both S/Gs is available from the RWST within one hour • At T=1 hour, operators will begin stripping DC loads serving non-essential equipment. After load stripping the operators will proceed to tie the two safety-related station batteries together. These actions will maximize battery life and the availability of vital instrumentation, and DC-powered equipment supporting the turbine-driven AFWP (e.g., lube oil, valves) • From T=1 hour to T= 12 hours, feedwater is supplied to the S/Gs by the turbine-driven AFWP and S/G level is controlled by local manual or control room throttling of the DC-powered AFW discharge motor-operated valves (MOVs). Cooldown and depressurization of the RCS and S/Gs is controlled in a manner that balances RCS heat removal with maintaining sufficient main steam supply to operate the AFWP turbine • From T=6 hours to 12 hours, augmented staff arrives on site and sets up a portable, diesel-powered low-head/high-flow (LHHF) pump and hoses drawing suction from Lake Michigan at the service water intake structure or the discharge canal. Suction for the turbine-driven AFWP is switched from the RWST to Lake Michigan via the LHHF pump and temporary hoses. This provides the sustained water inventory for the turbine-driven AFWP to continue feeding the S/Gs. AFW suction from the RWST is secured and sufficient RWST borated water inventory remains available for RCS

	inventory and reactivity control. At a feed rate of 210 GPM for 12 hours, a total of 151,200 gallons of RWST inventory would be used before switching to lake supply. This is about 55% of the RWST TS minimum volume of 272,500 gallons • From T=12 hours and beyond, AFW flow from the turbine-driven AFWP continues as long as adequate steam is available from the S/Gs to drive the pump turbine. When steam pressure is insufficient to drive the AFWP turbine, the high-head/high-flow portable FLEX pump is used to provide water from Lake Michigan directly to the S/Gs B. RCS Inventory and Reactivity Control • At T=0, the RCS letdown isolation valve closes on loss of air supply. The sole remaining identified source of RCS leakage is Reactor Coolant Pump (RCP) seal leakage, which begins at about 10 minutes after the loss of all AC power • RCS shrinkage will occur due to the reactor trip and natural circulation will commence. Pressurizer level remains within expected range as it would for a normal plant trip • RCP seal leakage (about 42 GPM total for two pumps*) is sufficiently low that the core will remain covered for at least 55 hours. This is premised on the availability of AFW to provide primary-to-secondary cooling and keep RCS pressure below the RCS (Power Operated Relief Valve) PORV and Code safety relief valve setpoints and the operators cooling down and depressurizing the S/Gs to minimize RCP seal leakage as directed by ECA-0.0 • From T=6 to T=24 hours, augmented plant staff will establish the diesel-driven, high-head/high-flow portable "FLEX" pump, hoses, and a flow path to provide direct RCS injection from the RWST for post-trip RCS inventory and core reactivity control • From T= 24 hours and beyond, RCS injection for core inventory control is maintained using the FLEX pump and the RWST. The required rate of injection from the RWST is small enough to provide a sustained source of RCS inventory (up to approximately 48 hours) *NOTE: At the time the decision was made to permanently cease power operations at KPS, plans were in place to replace both RCP seals with the N-9000 design, which is a virtually zero-leakage design. Thus, the 42 GPM

	value is very conservative for estimating durations here. C. Containment • At T=0, core cooling is provided as described above. Thus, no RCS safety relief valves will lift and no significant discharge of RCS fluid into containment will occur • From T=0 to 24 hours, the absence of containment heat removal (due to the unavailability of the containment fan coil units) and possibly some small amount of unidentified RCS leakage may cause containment pressurization. Containment pressurization, if it occurs, will proceed slowly despite the unavailability of the containment fan coil units because of the potential for a small amount of unidentified RCS leakage and the large volume and substantial heat sink the Reactor Building structure provides. Containment pressure remains below its design limit well beyond 24 hours • After 24 hours, containment pressure will be monitored and controlled at the operator's discretion D. Spent Fuel Pool Cooling • At T=0, the spent fuel pool (SFP) water will begin to slowly heat up from the spent fuel decay heat and lack of SFP cooling due to the loss of all AC power • From T=0 to T= 57 hours, the SFP water level very slowly drops due to normal evaporation while its temperature rises to 200°F. With no action, SFP water level would drop at a more rapid rate after reaching boiling temperature, until the level reaches 10 feet above the top of the stored fuel at 158 hours • From T=6 hours to T=158 hours, augmented staff will arrive on site and set up the LHHF pump to take suction from the service water intake or discharge canal and provide makeup to the spent fuel pool via hoses connected to a new permanent connection to the Service Water emergency SFP makeup injection line • With the LHHF pump and flow path to the SFP available, water level is restored to the normal range. Operators add water to the pool periodically upon receiving indication of SFP water low-level II. Possession-Only License Period During the possession-only license period at KPS, the SFP

	cooling BDBEE mitigation strategy is the only one required. The time frames shown below are based on a full core discharge into the SFP after 12 months of decay. This is conservative for the possession-only license time period because the mitigation strategy will not be implemented until at least 12 months from final reactor shutdown and decay heat load will continuously drop over time thereafter. Refer to the schematic diagram in Attachment 3 for the SFP inventory make-up flow path using the LHHF pump A. Spent Fuel Pool Cooling • At T=0, the SFP water will begin to slowly heat up from the spent fuel decay heat and lack of SFP cooling due to the loss of all AC power • From T=0 to T= 113 hours (see curve in Attachment 3), the SFP water level very slowly drops due to normal evaporation while its temperature rises to 200°F. With no action, SFP water level would drop at a more rapid rate until eventually level reaches 10 feet above the top of the stored fuel • From T=6 hours to T=113 hours, augmented staff set up the LHHF pump to take suction from the service water intake or discharge canal and provide makeup to the spent fuel pool via hoses connected to a new permanent connection to the Service Water emergency SFP makeup injection line • With the LHHF pump and flow path to the SFP available, responders restore lost level as necessary. Thereafter, water is added to the pool as necessary to maintain SFP level at the desired level
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.* I. Power Operation FLEX equipment will be dedicated for mitigating BDBEE. Personnel will not be permitted to use the equipment for other reasons in any mode of operation. During outages, equipment laydown strategies will include not blocking access to FLEX equipment, connection points, or access pathways. FLEX strategies will be implemented via written guidelines. For power operations, operators are directed to FLEX Support Guidelines (FSGs) from Emergency Operating Procedures (EOPs) and Abnormal Operating Procedures (AOPs). Entry into EOPs and AOPs is mode-specific by the nature of these procedures being symptom-

	based. In Modes 1 (Power Operation) and 2 (Startup), the reactor is at normal operating pressure and temperature. The reactor is critical with rods withdrawn to various positions up to full withdrawal. The plant remains in Mode 2 for only short periods of time during plant start-up and shutdown. In these modes, the turbine-driven AFWP is available. There are no differences in FLEX strategies between Modes 1 and 2. In Mode 3 (Hot Standby), the reactor is sub-critical. The RCS is at normal operating pressure and average RCS temperature is above 350°F. The plant remains in Mode 3 for limited periods of time during plant start-up and shutdown to allow for certain surveillance testing to be performed without the reactor critical and with the primary and secondary systems at hot conditions. In Mode 3, the turbine-driven AFWP is available. FLEX strategies remain the same as for Modes 1 and 2. In Mode 4 (Hot Shutdown), the reactor is sub-critical and the RCS is at lower pressure and temperature. Average RCS temperature is between 200°F and 350°F. Reactor coolant pumps may or may not be operating. The plant is transitioning between the residual heat removal system and S/G heat removal, either for start-up or shutdown. Availability of the turbine-driven AFWP in Mode 4 depends on RCS and S/G conditions at the time of the event. While the core cooling function may not be available via the turbine-drive AFWP, more time is available during the S/G boil-off period for actions due to lower core decay heat. If the turbine-driven AFWP is not unavailable, the FLEX pump will be used for direct injection of feedwater from Lake Michigan into the S/Gs. Other FLEX strategies remain the same as for Modes 1-3. In Mode 5 (Cold Shutdown) and Mode 6 (Refueling), average RCS temperature is less than 200°F, reactor coolant pumps are secured, and the residual heat removal system is in operation. The RCS is vented and pressure is atmospheric. In Mode 6, one or more reactor head bolts are detensioned or the reactor head may be removed. The FLEX core cooling strategy cannot rely upon the turbine-driven AFWP. However, due to lower RCS decay heat, significant time is available to set up the portable FLEX pump to maintain core cooling and RCS inventory via makeup from the RWST for most configurations. Containment is not required in Modes 5 or 6. The SFP

	cooling FLEX strategy remains the same. During refueling outages, all fuel is usually removed from the reactor for a portion of the outage. With all fuel removed from the reactor, the plant is in "no-mode" (i.e., no mode-related TS apply) and only the SFP cooling FLEX strategy applies. II. Possession-Only License Period All fuel is removed from the reactor and only the SFP cooling FLEX strategy applies.

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**
• **FLEX equipment acquisition timeline**
• **Training completion for the strategies**
• **Regional Response Centers 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.
	See attached milestone schedule Attachment 2
	
	No modifications, procedures, storage planning, staffing analysis, FLEX equipment acquisition, or training will be implemented for the core cooling, RCS inventory control, or containment FLEX strategies because the KPS reactor will be shut down and permanently defueled in the second quarter of 2013. The following plan applies only to implementation of the spent fuel pool FLEX strategy:
	
	The modifications required to implement the Phase 2 and 3 SFP cooling mitigation strategy will be performed in conjunction with other modifications to take KPS to a SAFSTOR condition for decommissioning. The schedule for these modifications will be provided at a later date.
	
	The schedule for performing a staffing analysis and establishing training and FLEX equipment storage plans for the plant in the SAFSTOR condition has not yet been established and will be provided at a later date. However, DEK will meet the requirement of the Order to implement the SFP cooling mitigation strategy no later than December 31, 2016.
	
	Periodic testing and preventative maintenance of the BDB equipment will follow the guidance provided in INPO AP-913. The testing and maintenance recommendations will be developed by EPRI and these EPRI guidance documents will be used to develop testing frequencies and maintenance schedules.

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.* Programmatic controls for the SFP cooling FLEX mitigation strategy will be developed after the final design for providing SFP makeup is determined. A. Quality Attributes The permanent equipment installed to implement the SFP cooling strategy (e.g., valves, piping. access opening, and electrical connections) will have the quality attributes applicable to the function of the equipment for system operation (i.e., pressure retaining, class boundary, function, etc.). Standard plant processes for determining quality attributes for permanent plant equipment will be used. The portable equipment needed to implement the SFP cooling strategy is already on site and was procured as commercial grade equipment. Appropriate storage, maintenance, testing, and configuration control attributes will be applied to ensure the equipment will function as designed when called upon. B. Equipment Design The equipment used to implement the SFP cooling strategy is sized to produce an adequate water flow rate to exceed the rate of SFP level loss and restore SFP level in a prompt time frame such that frequent cycling of the pump is not required. Permanently installed piping, isolation valves, power distribution equipment, and instrumentation will be designed in accordance with plant and applicable code requirements for the design function. C. Equipment Storage Permanent plant modifications will be designed per the KPS design basis for seismic, missile protection, etc. The LHHF pump will be stored in the Auxiliary Building (AB) loading dock, which is seismically evaluated but not missile-protected. The 120VAC diesel-generator will be stored inside a seismically-evaluated, missile protected area of the AB. Portable equipment will be stored in

	existing plant structures designed in accordance with the local building code. If portable equipment is non-functional due to the BDBEE, sufficient time is available to acquire offsite equipment from another unaffected Dominion plant. Personnel and vehicle access pathways will be cleared, if necessary, with onsite equipment, such as a front-end loader. D. Procedures FLEX support guidelines (FSGs) will be developed to respond to an ELAP/LUHS event. Maintenance procedures for FLEX equipment will also be developed consistent with the INPO/EPRI guidance to ensure the equipment can perform its design function when called upon. This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (AC) power and loss of normal access to the ultimate heat sink resulting from a beyond-design-basis event by providing adequate capability to maintain or restore SFP cooling. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications and/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). (Ref. Task Interface Agreement (TIA) 2004-04, "Acceptability of Proceduralized Departures from Technical Specifications (TSs) Requirements at the Surry Power Station, dated September 12, 2006.)

A.8 - Describe training plan	*List training plans for affected organizations or describe the plan for training development* The training for implementation of the FLEX mitigation strategy for SFP cooling will be developed as part of the post-shutdown/decommissioning training program.
A.9 - Describe Regional Response Center plan	KPS will be permanently shut down and the reactor defueled in the second quarter of 2013. Therefore, only the SFP cooling mitigation strategy will be implemented. The SFP level loss due to lack of cooling occurs slowly due to low decay heat load. Sufficient time exists after event initiation to first use onsite equipment to restore the capability to make up to the SFP or obtain necessary FLEX equipment from other unaffected Dominion sites or procure it. Therefore, KPS will not be a participant in the Regional Response Center.
Notes:	

B. Maintain Core Cooling & Heat Removal	
Determine Baseline coping capability with installed coping[2] 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 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, no BDBEE mitigation strategy for core cooling will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain core cooling after a BDBEE prior to the announcement of permanent plant shutdown.	
Details:	
B.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Not applicable
B.1.2 - Identify modifications	*List modifications and describe how they support coping time.* Not applicable
B.1.3 - Key Reactor Parameters	*List instrumentation credited for this coping evaluation phase.* Not applicable
Notes:	

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

B Maintain Core Cooling & Heat Removal	
B.2 - KPS 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 NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, no BDBEE mitigation strategy for core cooling will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain core cooling after a BDBEE prior to the announcement of permanent plant shutdown.	
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* Not applicable
B.2.2 - Identify modifications	*List modifications necessary for phase 2* Not applicable
B.2.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation* Not applicable
B.2.4 - Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* Not applicable
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* Not applicable
Severe Storms with High Winds	*List Protection or schedule to protect* Not applicable
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* Not applicable

B Maintain Core Cooling & Heat Removal		
B.2 - KPS Portable Equipment Phase 2		
High Temperatures	*List Protection or schedule to protect* Not applicable	
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. Not applicable	*Identify modifications*	*Identify how the connection is protected*
Notes:		

B. Maintain Core Cooling & Heat Removal	
B.3 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, no BDBEE mitigation strategy for core cooling will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain core cooling after a BDBEE prior to the announcement of permanent plant shutdown.	
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.* Not applicable
B.3.2 - Identify modifications	*List modifications necessary for phase 3* Not applicable
B.3.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Not applicable

B.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. Not applicable	*Identify modifications*	*Identify how the connection is protected*

B. Maintain Core Cooling & Heat Removal
B.3 - KPS Portable Equipment Phase 3
Notes:

C. Maintain RCS Inventory Control	
Determine Baseline coping capability with installed coping[3] 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 - KPS Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, no BDBEE mitigation strategy for RCS inventory control will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain RCS inventory after a BDBEE prior to the announcement of permanent plant shutdown.	
Details:	
C.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Not applicable
C.1.2 - Identify modifications	*List modifications* Not applicable
C.1.3 - Key Reactor Parameters	*List instrumentation credited for this coping evaluation.* Not applicable.
Notes:	

[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.

C. Maintain RCS Inventory Control	
C.2 - KPS Portable Equipment Phase 2:	
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, no BDBEE mitigation strategy for RCS inventory control will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain RCS inventory after a BDBEE prior to the announcement of permanent plant shutdown.	
Details:	
C.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Not applicable
C.2.2 - Identify modifications	*List modifications* Not applicable
C.2.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation* Not applicable

C.2.4 - Storage / Protection of Equipment: Describe storage / protection plan or schedule to determine storage requirements	
Seismic	*List Protection or schedule to protect* Not applicable
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* Not applicable
Severe Storms with High Winds	*List Protection or schedule to protect* Not applicable
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* Not applicable
High Temperatures	*List Protection or schedule to protect*

C. Maintain RCS Inventory Control		
C.2 - KPS Portable Equipment Phase 2:		
	Not applicable	
C.2.5 - Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use Not applicable	*Identify modifications*	*Identify how the connection is protected*
Notes:		

C. Maintain RCS Inventory Control	
C.3 - KPS Portable Equipment Phase 3:	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time.. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. Therefore, no BDBEE mitigation strategy for RCS inventory control will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain RCS inventory after a BDBEE prior to the announcement of permanent plant shutdown.	
Details:	
C.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Not applicable
C.3.2 - Identify modifications	*List modifications* Not applicable
C.3.3 - Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Not applicable

C.3.4 - Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use. Not applicable	*Identify modifications*	*Identify how the connection is protected*
Notes:		

<table>
<tr><td colspan="2">D. Maintain Containment</td></tr>
<tr><td colspan="2">Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:
• Containment Spray
• Hydrogen igniters (ice condenser containments only)</td></tr>
<tr><td colspan="2">D.1 - KPS Installed Equipment Phase 1:</td></tr>
<tr><td colspan="2">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.

NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. No fuel will remain in the Reactor Building and containment is not required. Therefore, no BDBEE mitigation strategy for maintaining containment will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain containment after a BDBEE prior to the announcement of permanent plant shutdown.</td></tr>
<tr><td colspan="2">Details:</td></tr>
<tr><td>D.1.1 - Provide a brief description of Procedures / Strategies / Guidelines</td><td>N/A

Not applicable</td></tr>
<tr><td>D.1.2 - Identify modifications</td><td>N/A

Not applicable</td></tr>
<tr><td>D.1.3 - Key Containment Parameters</td><td>List instrumentation credited for this coping evaluation.

Not applicable</td></tr>
<tr><td colspan="2">Notes:</td></tr>
</table>

[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.

D. Maintain Containment	
D.2 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. No fuel will remain in the Reactor Building and containment is not required. Therefore, no BDBEE mitigation strategy for maintaining containment will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain containment after a BDBEE prior to the announcement of permanent plant shutdown.	
Details:	
D.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Not applicable
D.2.2 - Identify modifications	*List modifications* Not applicable
D.2.3 - Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Not applicable

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* Not applicable
Flooding	*List how equipment is protected or schedule to protect* Not applicable
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Not applicable
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Not applicable
High Temperatures	*List how equipment is protected or schedule to protect*

D. Maintain Containment		
	Not applicable	
D.2.5 - Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use. Not applicable	*Identify modifications*	*Identify how the connection is protected*
Notes:		

D. Maintain Containment

D.3 - KPS 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.

NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013.. No fuel will remain in the Reactor Building and containment is not required. Therefore, no BDBEE mitigation strategy for maintaining containment will be implemented at KPS. See Section A in this plan for a high-level summary of the conceptual design strategy that was developed to maintain containment after a BDBEE prior to the announcement of permanent plant shutdown.

Details:

D.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Not applicable
D.3.2 - Identify modifications	*List modifications* Not applicable
D.3.3 - Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Not applicable

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

Strategy	Modifications	Protection of connections
Identify Strategy including how the equipment will be deployed to the point of use. Not applicable	*Identify modifications*	*Identify how the connection is protected*

Notes:

E. Maintain Spent Fuel Pool Cooling

Determine Baseline coping capability with installed coping[5] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

- **Makeup with Portable Injection Source**

E.1 - KPS 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.

NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. The description provided for a BDBEE mitigation strategy to maintain spent fuel pool cooling reflects the fact that SFP cooling will be the only safety function that KPS responders will need to address in a BDBEE.

There are no Phase 1 actions required at this time that need to be addressed.

Details:	
E.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	N/A
E.1.2 - Identify modifications	N/A
E.1.3 - Key SFP Parameter	N/A

Notes: Because the KPS will have been permanently shut down for an extended period, the decay heat load in the spent fuel pool at the time of the BDBEE will be much lower than that produced by a recently discharged full core. A curve of spent fuel pool temperature versus time (provided in Attachment 3) shows the time before the SFP reaches 200°F is approximately 113 hours. This assumes an initial SFP temperature of 80°F and a full core (121 fuel assemblies) discharge with a decay time of 12 months.

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

E. Maintain Spent Fuel Pool Cooling	
E.2 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. The description provided for a BDBEE mitigation strategy to maintain spent fuel pool cooling reflects the fact that SFP cooling will be the only safety function that KPS responders will need to address in a BDBEE.	
Details:	
E.2.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Because the SFP water level and temperature instrumentation are powered by the plant 120VAC power distribution system, these instruments will be non-functional after an ELAP/LUHS. SFP level is available by visual observation locally at the SFP using a "ruler" gauge attached to the SFP wall. The SFP operating floor area radiation monitor and control room annunciators will also be unavailable after the ELAP/LUHS event. Due to the low decay heat load in the SFP, it will take over 100 hours for the SFP temperature to reach 200°F (see the SFP heatup curve in Attachment 3). Once the SFP temperature reaches boiling point temperature, several additional days are available before make-up capability to the SFP is required (i.e., before the water level approaches the top of the stored fuel). The KPS objective is to have SFP makeup capability before SFP level drops to ten feet above the top of the stored fuel in order to maintain radiation shielding for personnel initiating SFP makeup strategies. When responders determine the ELAP/LUHS will last for an extended period of time, personnel are summoned to the site as required. Actions are then initiated to restore power to the SFP level instrumentation and establish the capability to provide makeup to the spent fuel pool from a sustained water source. A 120VAC portable diesel generator is retrieved from storage and taken to an accessible location where cables can reach the disconnect/receptacle used to re-power SFP instrumentation. Details of this mitigation strategy are still under development as part of the plant SAFSTOR configuration and will be provided at a later date.

E. Maintain Spent Fuel Pool Cooling	
	Personnel will also retrieve the diesel-powered, trailer-mounted LHHF pump and suction hose from storage and move it to a location near the intake screenhouse. While the pump is readied for operation, personnel retrieve another trailer with the exterior fire hose from storage and move it to the area adjacent to the Auxiliary Building (AB) north wall. One end of the suction hose is connected to LHHF pump suction and the other is dropped into Lake Michigan at the screenhouse or discharge canal . The supply hose is connected between the LHHF pump discharge and fed to an area on the ground near the AB north wall. Personnel retrieve the interior fire hose and connect one end to the service water (SW) emergency SFP makeup system injection line and feed the other end through the new access opening in the AB north wall of the SFP heat exchanger room, and down to the ground outside. At this location, the LHHF pump supply hose can be connected to the interior fire hose to complete the SFP make-up flow path. Upon opening two permanently installed valves near the SW emergency SFP makeup system injection line and starting the LHHF pump, sustained makeup capability to the SFP from Lake Michigan is established. Depending on the SFP level at the time makeup capability from Lake Michigan is established, responders may need to make up to the SFP to restore level to the high-level setpoint. From that point forward, responders make up to the SFP as needed to maintain the desired level. This process is maintained indefinitely. SFP Level will be monitored using level indication instrumentation installed in response to NRC Order EA-12-051. FLEX Support Guidelines will be developed along with operating, abnormal, and emergency procedures supporting SAFSTOR operation.
E.2.2 - Identify modifications	*List modifications* Modifications required (to be integrated with modifications required to put the plant in SAFSTOR): • New 120VAC wall-mounted disconnect/receptacle with cables and cable trays. • New permanent hard-pipe connection and valves, in the SW emergency SFP makeup injection line. • New access opening in the steel plate covering the access port in the north AB wall to the SFP heat exchanger room.

E. Maintain Spent Fuel Pool Cooling	
E.2.3 - Key SFP Parameters	*Per EA 12-051* • SFP level • SFP operating floor area radiation
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* Permanent plant modifications will be seismically designed per the KPS seismic design basis. The LHHF pump will be stored in the AB loading dock, which is seismically evaluated but not missile-protected. The 120VAC diesel-generator will be stored inside a seismically-designed, missile protected area of the AB. Portable equipment will be stored in existing plant structures designed in accordance with the local building code. If portable equipment is non-functional due to the seismic event, sufficient time is available to acquire offsite equipment from another unaffected Dominion plant. Personnel and vehicle access pathways will be cleared, if necessary, with onsite equipment, such as a front-end loader.
Flooding	*List how equipment is protected or schedule to protect* All equipment will be stored and located above the design basis flood level for the plant.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Except for the AB north wall access opening, all permanently installed FLEX equipment is protected from storms and wind. The AB north wall access opening will be protected from airborne missiles by a cover plate or hatch that will be easily removable from inside the AB. Portable equipment will be stored in existing plant structures designed in accordance with the local building code. If portable equipment is non-functional due to the BDB event, sufficient time is available to acquire offsite equipment from another unaffected Dominion plant. Personnel and vehicle access pathways will be cleared, if necessary, with onsite equipment, such as a front-end loader.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Except for the AB north wall access opening, all permanently installed FLEX equipment is inside the AB and protected from snow, ice, and extreme cold. The AB north wall access opening will be established from the inside of the AB by removing a cover plate or hatch.

E. Maintain Spent Fuel Pool Cooling	
	Personnel and vehicle access pathways will be cleared, if necessary, with onsite equipment, such as a snowplow or front-end loader. De-icing agents are normally applied to access paths and roads pre-emptively based on site weather conditions. In the winter, ice can build up at the intake near the screenhouse. Depending on the severity of the icing, the ice could be broken by responders to permit the LHHF pump suction hose to be installed or the discharge canal could be used as the suction source.
High Temperatures	*List how equipment is protected or schedule to protect* Except for the AB north wall access opening, all permanently installed FLEX equipment is inside the AB and protected from high temperatures. The AB north wall access opening will be established from inside the AB by opening a cover plate or hatch. Thus, extreme high temperatures are not a problem for implementation of this strategy.

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*
Provide 120VAC power to SFP instrumentation	New 120VAC wall-mounted disconnect/receptacle with cables and cable trays	Seismically-designed and missile protected.
Provide alternate FLEX injection pathway for SFP makeup	Permanent hard-pipe connection, valves, and blind flange in the SW emergency SFP makeup injection line	Seismically-designed. Located inside the Auxiliary Building
Provide flow pathway from outdoor to indoors for SFP makeup	Access opening in the steel plate covering the access port to the SFP heat exchanger room north AB wall	Seismically designed and missile protected.

Notes: The Technical Support Center (TSC), including a backup diesel-generator will be maintained in a ready status as long as there is fuel in the SFP. If necessary, fuel from the TSC diesel fuel oil tank could be transferred to the 120VAC diesel generator and/or the LHHF pump until fuel from offsite is made available. KPS will maintain fuel cans and pumps on site to transfer the fuel, if needed.

E. Maintain Spent Fuel Pool Cooling

E.3 - KPS 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.

NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. The description provided for a BDBEE mitigation strategy to maintain spent fuel pool cooling reflects the fact that SFP cooling will be the only safety function that KPS responders will need to address in a BDBEE.

Details:

E.3.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* In order to maintain SFP cooling indefinitely, offsite support will consist only of delivering diesel fuel for the 120VAC diesel generator and the LHHF pump. If the generator or pump breaks down, sufficient time is available to acquire a replacement generator or pump from another unaffected Dominion site.
E.3.2 - Identify modifications	*List modifications* None in addition to those required for Phase 2.
E.3.3 - Key SFP Parameter	*Per EA 12-051* • SFP level • SFP operating floor area radiation

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.	*Identify modifications*	*Identify how the connection is protected*
See Phase 2		

E. Maintain Spent Fuel Pool Cooling
Notes:

F. Safety Functions Support	
Determine Baseline coping capability with installed coping[6] modifications not including FLEX modifications.	
F.1 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. The description provided for a BDBEE mitigation strategy to provide support functions to maintain spent fuel pool cooling reflects the fact that SFP cooling will be the only safety function that KPS responders will need to address in a BDBEE. **There are no Phase 1 safety function support actions required at this time that need to be addressed.**	
Details:	
F.1.1 - Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Not applicable
F.1.2 - Identify modifications	*List modifications and describe how they support coping time.* Not applicable
F.1.3 - Key Parameters	*List instrumentation credited for this coping evaluation phase.* Not applicable
Notes:	

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

F. Safety Functions Support	
F.2 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. The description provided for a BDBEE mitigation strategy to provide support functions to maintain spent fuel pool cooling reflects the fact that SFP cooling will be the only safety function that KPS responders will need to address in a BDBEE.	
Details:	
F.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.* Currently, upon loss of all AC power, the only lighting remaining is the existing battery-operated emergency lighting in the control room and Appendix R lighting throughout the plant. The emergency and Appendix R lighting will be augmented by flashlights and portable battery-powered lights to implement the SFP cooling FLEX strategy. The portable battery-powered lights will be staged near the areas where responders will be taking actions and plugged into power outlets to keep the batteries charged. Loss of HVAC is not a concern for ensuring SFP cooling.
F.2.2 - Identify modifications	*List modifications necessary for phase 2* Installation of brackets for portable light staging
F.2.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation* None

F.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* Emergency lighting inside the AB is seismically designed, as will be the support structures for temporary lights. If lights are non-functional due to a seismic event, flashlights or portable lights will be available for use in the affected areas. Additional lighting

F. Safety Functions Support		
F.2 - KPS Portable Equipment Phase 2		
	requirements for FLEX equipment storage locations are still being determined and will be provided at a later date.	
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* All FLEX operational and access areas are above the design basis flood level.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Lighting inside the AB is protected from storms and wind by the building structures. If lights are non-functional due to a storm or wind event, flashlights or portable lights will be available for use in the affected areas. Additional lighting requirements for FLEX equipment storage locations are still being determined and will be provided at a later date.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Lighting inside the AB is protected from snow, ice, and extreme cold by the building structures. If lights are non-functional due to snow, ice, or extreme cold, flashlights or portable lights will be available for use in the affected areas. Additional lighting requirements for FLEX equipment storage locations are still being determined and will be provided at a later date.	
High Temperatures	*List how equipment is protected or schedule to protect* Lighting inside the AB is protected from high temperatures by the building structures. If lights are non-functional due to high temperatures, flashlights or portable lights will be available for use in the affected areas. Additional lighting requirements for FLEX equipment storage locations are still being determined and will be provided at a later date.	
F.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*
Provide lighting for FLEX equipment operational and storage areas, and access	Installation of wall brackets for portable light staging.	Portable lights will be battery-powered and stored near electrical outlets to keep

F. Safety Functions Support		
F.2 - KPS Portable Equipment Phase 2		
pathways		batteries charged.
Notes:		

F. Safety Functions Support		
F.3 - KPS 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. NOTE: DEK will be permanently shutting down the KPS reactor on May 7, 2013, in accordance with DEK's letter to NRC "Certification of Permanent Cessation of Power Operations," dated February 25, 2013. The description provided for a BDBEE mitigation strategy to provide support functions to maintain spent fuel pool cooling reflects the fact that SFP cooling will be the only safety function that KPS responders will need to address in a BDBEE.		
Details:		
F.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.* Supplemental lighting strategy will be the same strategy as described in Phase 2.	
F.3.2 - Identify modifications	*List modifications necessary for phase 3* See Phase 2	
F.3.3 - Key Parameters	*List instrumentation credited or recovered for this coping evaluation* See Phase 2	

F.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.	*Identify modifications*	*Identify how the connection is protected*
See Phase 2	See Phase 2	See Phase 2

F. Safety Functions Support
F.3 - KPS Portable Equipment Phase 3
Notes:

Table 1 - KPS Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Trailer-mounted, diesel-driven low-head/high-flow pump			**X**			900 gpm at 450 ft	Per industry guidance
Fire hose			**X**			400 psig, minimum	
120VAC diesel-generator				**X**	**X**	6 kW	Per industry guidance
Portable lights					**X**		
Flashlights					**X**		
Fuel Cart with Transfer Pump					**X**		Per industry guidance

Table 2 - KPS Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Trailer-mounted, diesel-driven low-head/high-flow pump			**X**			900 gpm at 450 ft	
Fire hose			**X**			400 psig, minimum	
120 VAC diesel-generator				**X**		6 kW	
Portable lights					**X**		
Flashlights					**X**		
Fuel Cart with Transfer Pump					**X**		

Table 3 - Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	
Commodities • Food • Potable water	
Fuel Requirements	Diesel fuel replenishment from offsite will be required for the 120VAC diesel-generator and the LHHF pump. Onsite diesel fuel may be available from the TSC diesel-generator storage tank.
Heavy Equipment • Transportation equipment • Debris clearing equipment	• Front-end loader • Forklift • Small snowplow

Attachment 1
KPS EA 12-049 Sequence of Events Timeline

(insert site specific time line to support submittal)

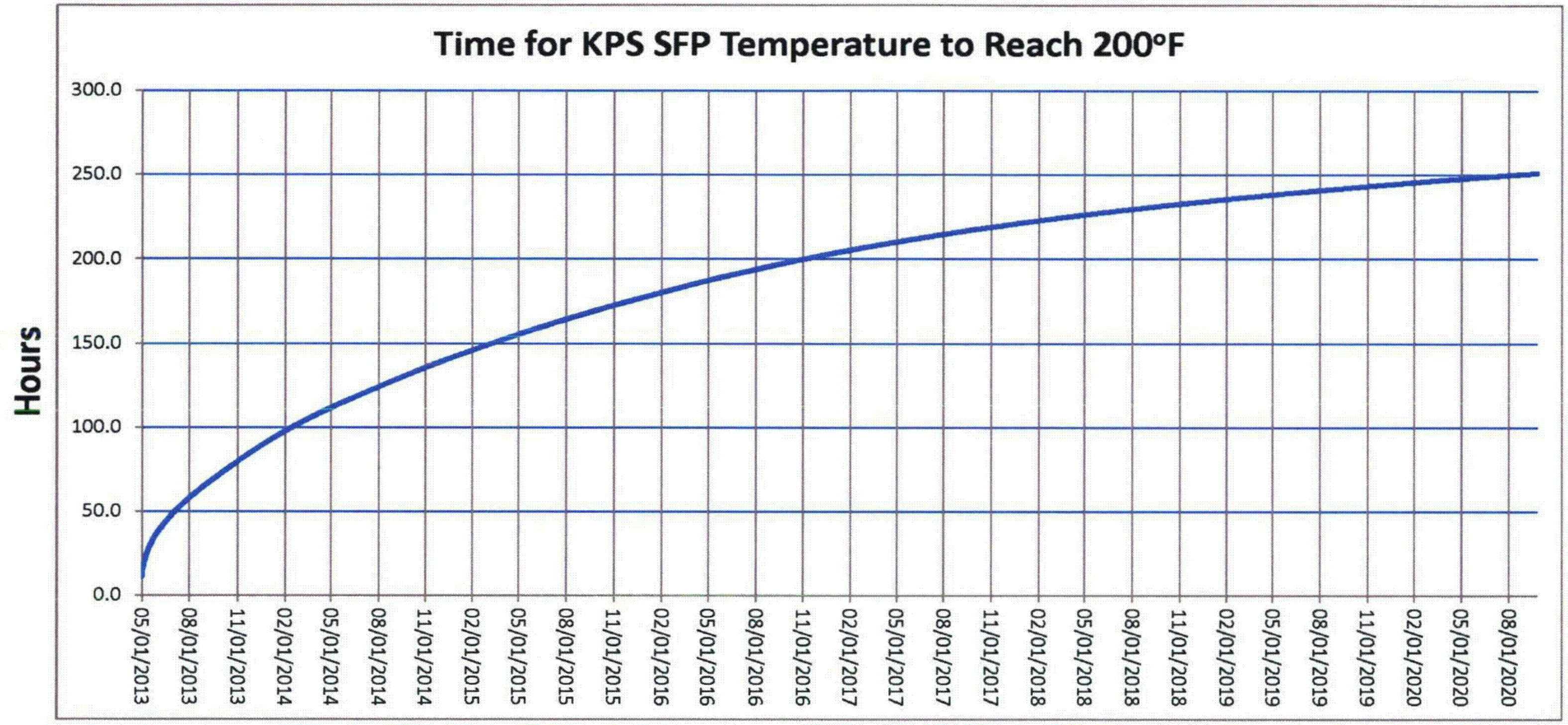
Action item	Elapsed Time	Action	Time Constraint Y/N [7]	Remarks / Applicability
	0	Event Starts	NA	Reactor defueled, spent fuel decayed for one year
1	1 hr	Complete inspection of SFP for damage and leakage	N	
2	2 hrs	120VAC portable generator connected to re-power SFP instrumentation and alarms	N	
3	4 hrs	Verify portable equipment is undamaged	N	
4	6+ hrs	Set up portable LHHF pump for injection to SFP when SFP level alarm is received. Contact another unaffected Dominion site for backup pump, if needed.	N	
5				
6				
7				
8				
9				
10				

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

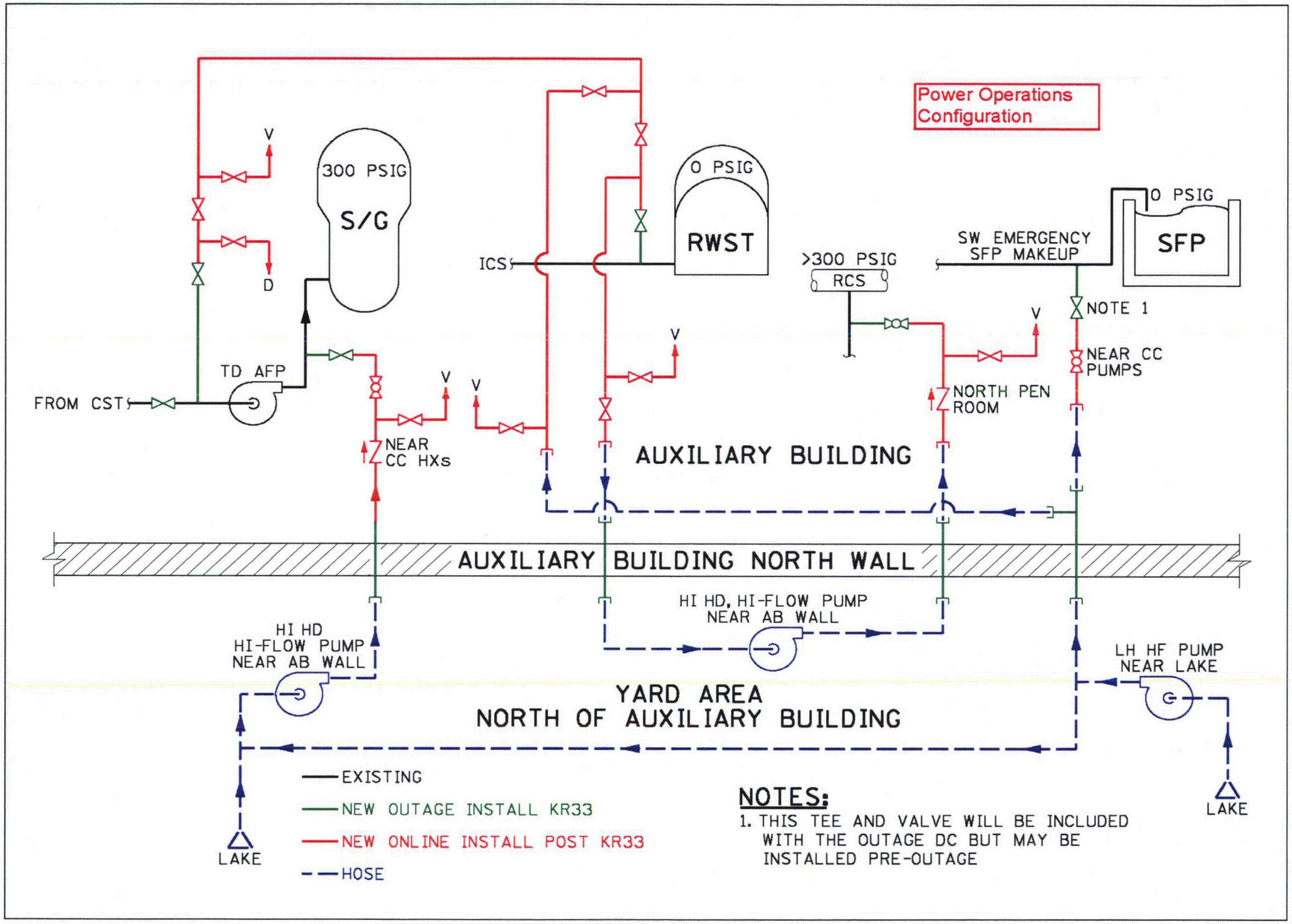
Attachment 2
KPS EA 12-049 Milestone Schedule

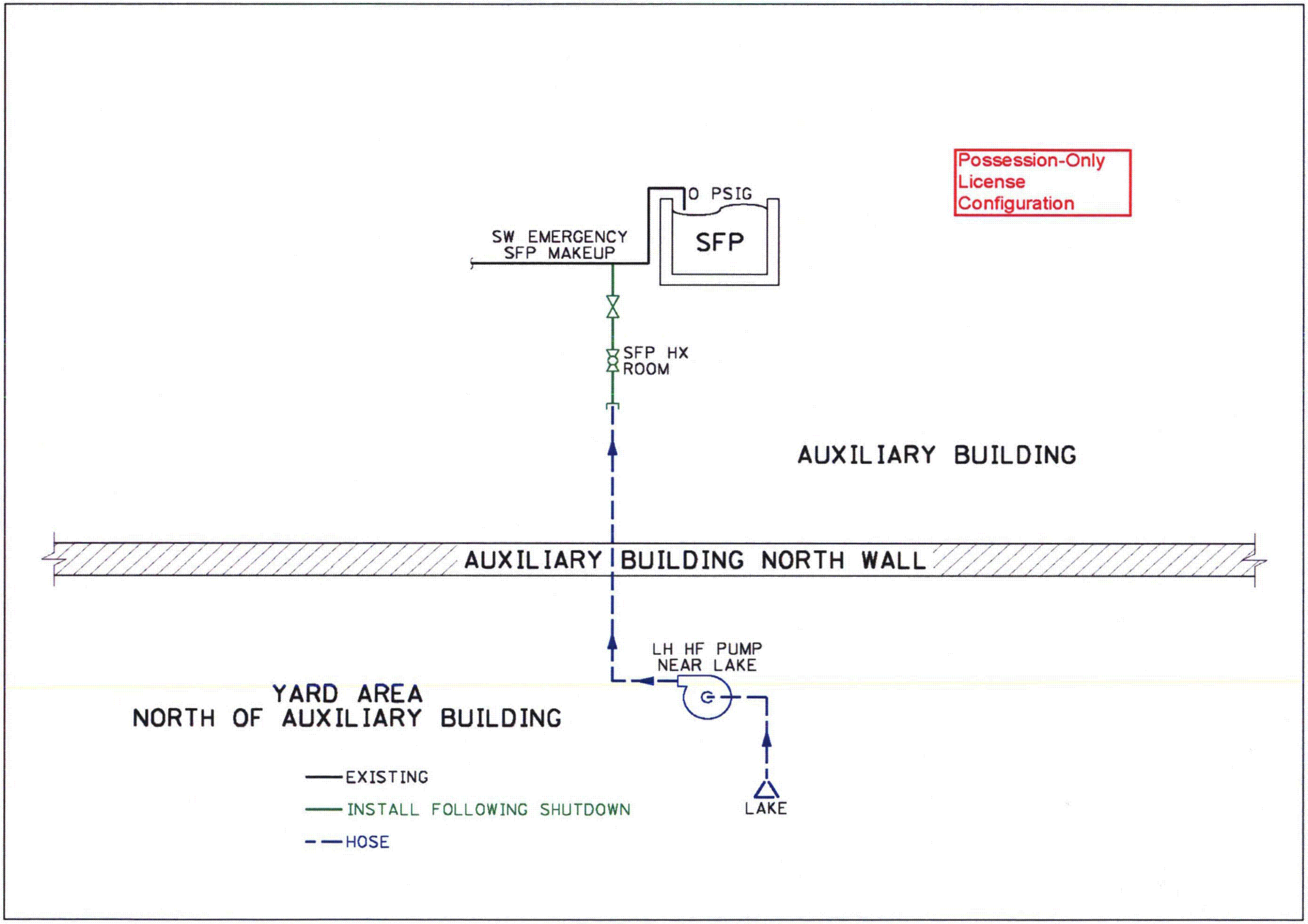
The KPS schedule for implementation of the SFP cooling FLEX strategy will be developed as part of the decommissioning schedule for placing the plant in a SAFSTOR condition.

Attachment 3
KPS EA 12-049 SFP Heatup Curve and Conceptual Sketches



Date SFP Cooling is Lost
(Assumes May 2013 Final Reactor Shutdown)


Power Operations
Configuration
300 PSIG
S/G
0 PSIG
RWST
0 PSIG
SFP
SW EMERGENCY
SFP MAKEUP
>300 PSIG
RCS
ICS
V
D
TD AFP
FROM CST
NEAR
CC HXs
NOTE 1
NEAR CC
PUMPS
NORTH PEN
ROOM
AUXILIARY BUILDING
AUXILIARY BUILDING NORTH WALL
HI HD, HI-FLOW PUMP
NEAR AB WALL
HI HD
HI-FLOW PUMP
NEAR AB WALL
LH HF PUMP
NEAR LAKE
YARD AREA
NORTH OF AUXILIARY BUILDING
LAKE
LAKE
EXISTING
NEW OUTAGE INSTALL KR33
NEW ONLINE INSTALL POST KR33
HOSE
NOTES:
1. THIS TEE AND VALVE WILL BE INCLUDED
WITH THE OUTAGE DC BUT MAY BE
INSTALLED PRE-OUTAGE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0 PSIG
SFP
SW EMERGENCY SFP MAKEUP
SFP HX ROOM
AUXILIARY BUILDING
AUXILIARY BUILDING NORTH WALL
LH HF PUMP NEAR LAKE
YARD AREA NORTH OF AUXILIARY BUILDING
EXISTING
INSTALL FOLLOWING SHUTDOWN
HOSE
LAKE