Exelon Generation.

RS-13-020

Order No. EA-12-049

February 28, 2013

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

Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

Subject: Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" dated March 12, 2012
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. Exelon Generation Company, LLC'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

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

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

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

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

The information in the enclosure provides the Dresden Nuclear Power Station, Units 2 and 3 Overall Integrated Plan for mitigation strategies pursuant to Reference 3. 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.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David P. Helker at 610-765-5525.

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

Respectfully submitted,

Glen T. Kaegi
Director - Licensing & Regulatory Affairs
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Enclosure:

1. Dresden Nuclear Power Station, Units 2 and 3 Mitigation Strategies (MS) Overall Integrated Plan

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Enclosure 1

Dresden Nuclear Power Station, Units 2 and 3

Mitigation Strategies (MS)

Overall Integrated Plan

(70 pages)

<table>
<tr><th colspan="2">General Integrated Plan Elements BWR</th></tr>
<tr><td>Site: Dresden</td><td></td></tr>
<tr><td>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.

Seismic events, except soil liquefaction; external flooding; severe storms with high winds; snow, ice and extreme cold; and high temperatures were determined to be applicable Extreme External Hazards for Dresden Nuclear Power Station (DNPS or Dresden) per the guidance of NEI 12-06 and are as follows:

<u>Seismic Hazard Assessment</u>:

Per the Update Final Safety Analysis Report (UFSAR) (Reference 1, Section 1.2.2.1.5), the seismic criteria for DNPS design criteria is 0.2 g horizontal ground motion with a simultaneous vertical acceleration of 0.133 g.

It is not expected that Dresden roads would be subject to damage caused by liquefaction in a seismic event.

The Dresden UFSAR (Reference 1, Section 2.5.1.1) describes the site geology as a thin (less than 10-foot) mantle of soil, mostly glacial drift, overlying bedrock at the site.

Per the DNPS West ISFSI 10 CFR 72.212 Evaluation Report (Reference 3, Section 2.1.3), DNPS is located in seismic zone 1. Using an empirical technique outlined in the NAVFAC Design Manual (DM-7.3) to evaluate liquefaction potential of soils, for sites in seismic zone 1, a factor of safety in excess of 5 was calculated for the granular deposits encountered in the DNPS East ISFSI soil borings.

With a safety factor of 5 for soil liquefaction the potential for liquefaction is low. Therefore, soil liquefaction will not be considered for assessment within the site boundary.

Per NEI 12-06 (Reference 2, Section 5.2), all sites will consider the seismic hazard. Thus, DNPS screens in for an assessment for seismic hazard except for liquefaction.

<u>External Flood Hazard Assessment:</u>

The Probable Maximum Flood (PMF), described in the</td></tr>
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	Dresden UFSAR (Reference 1, Section 3.4.1.1), produces a peak flood to elevation 528'-0" at the Dresden site. This is above the grade elevation (517'-0"). The PMF is a precipitation based event. Therefore, time is available to relocate equipment and stage necessary measures to support plant response to rising water levels. Thus, DNPS screens in for an assessment for external flooding. <u>Extreme Cold Hazard Assessment:</u> DNPS is located at 88°16'09" W longitude and 41°23'23" N latitude. The guidelines provided in NEI 12-06 (Reference 2, Section 8.2.1) include the need to consider extreme snowfall at plant sites above the 35^{th} parallel. DNPS is located above the 35^{th} parallel and thus the capability to address impedances caused by extreme snowfall with snow removal equipment is required. DNPS is located within the region characterized by EPRI as ice severity level 5 (Reference 2, Figure 8-2). As such, DNPS is subject to severe icing conditions that could also cause catastrophic destruction to electrical transmission lines. Thus, DNPS screens in for an assessment for ice, snow and extreme cold hazard assessment. <u>High Wind Hazard Assessment:</u> DNPS is located at 88°16'09" W longitude and 41°23'23" N latitude. Per NEI 12-06 (Reference 2, Figure 7-2) guidance tornado hazards are applicable to Dresden. Thus, DNPS screens in for an assessment for High Wind Hazard. <u>Extreme High Temperature Hazard Assessment:</u> The guidelines provided in NEI 12-06 (Reference 2, Section 9.2) include the need to consider high temperature at all plant sites in the lower 48 states. Extreme high temperatures are not expected to impact the utilization of off-site resources or the ability of personnel to implement the required FLEX strategies. Site industrial safety procedures currently address activities with a potential for heat stress to prevent adverse impacts on personnel. Thus, DNPS screens in for an assessment for extreme High Temperature. <u>References</u>

	1. Dresden Nuclear Power Station Updated Final Safety Analysis Report, Revision 9 2. Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", NEI 12-06, Revision 0, August 2012 3. DNPS West ISFSI 10 CFR 72.212 Evaluation Report, Revision 3, November 2011
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. • The FLEX strategies identified in this document were developed using the current DNPS Flooding strategy. Efforts are in progress to revise the DNPS actions for a flooding event that may impact FLEX strategies. Information will be provided in a future update if changes to the Dresden FLEX plan are required. • Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours. • Plant initial response is the same as SBO. • No additional single failures of any SSC are assumed (beyond the initial failures that define the Extended Loss of AC Power (ELAP)/Loss of Access to Ultimate Heat Sink (LUHS) scenario in NEI 12-06) (Reference 1). • Primary and secondary storage locations have not been selected. Once locations are finalized implementation routes will be defined. • Storage locations will be chosen in order to support the event timeline. • BWROG EOP Revision EPG/SAG Rev.3, containing items such as guidance to allow early venting and to maintain steam driven injection equipment available during emergency depressurization, is approved and implemented in time to support compliance date. • DC battery banks are available. • AC and DC distribution systems are available. • Maximum environmental room temperatures for habitability or equipment availability are based on NUMARC 87-00 (Reference 2) guidance if other

design basis information or industry guidance is not available.

- This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (AC) power and loss of normal access to the ultimate heat sink resulting from a beyond-design-basis event by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). (Reference 3).

References

1. Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", NEI 12-06, Revision 0, August 2012
2. NUMARC 87-00, Revision 1, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors
3. 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)

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.* Full conformance with JLD-ISG-2012-01 and NEI 12-06 is expected with no deviations.
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). General Technical Basis information • Issuance of BWROG document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines" on 01/31/2013 did not allow sufficient time to perform the analysis of the deviations between Exelon's engineering analyses and the analyses contained in the BWROG document prior to commencing regulatory reviews of the Integrated Plan. This analysis is expected to be completed, documented on Attachment 1B, and provided to the NRC in the August 2013 six (6) month status update. • The times to complete actions in the Events Timeline are based on operating judgment, the conceptual designs, and the current supporting analyses. The final timeline will be time validated once detailed designs are completed, procedures are developed, and the results will be provided in a future six (6) month update. ITEM #10 Secure Isolation Condenser (IC). Per MAAP analysis (Reference 1) the IC will be isolated at 20 minutes due to lack of qualified shell-side makeup water. ITEM #11 DC load shedding must be completed within 30 minutes to

	maintain battery availability for the maximum time possible. A preliminary review of battery availability being performed identifies the 125 and 250VDC batteries will operate for at least 6 hours before dropping to unacceptable voltage levels if deep load shed is performed. Further review and analysis will be performed to support this assumption. The information will be provided in a future update if changes to the Dresden plan are required. ITEM #14 Establish natural circulation air flow path through the High Pressure Coolant Injection (HPCI) room. Preliminary GOTHIC analysis indicates opening doors at 2 hours will result in acceptable room temperature values to support operation of HPCI for at least 6 hours. The GOTHIC analysis indicates the temperature is approximately 155°F after 6 hours which is below the lowest Group 4 Isolation Point of 162°F specified in DIS 2300-07 (Reference 2). ITEM#18 MAAP analysis (Reference 1, DRE_FLEX_CASE5) indicates that initiation of the IC at the six (6) hour point will result in RPV water level being maintained above top of active fuel (TAF) for greater than 24 hours. A BWROG review of Reactor Core Isolation Cooling (RCIC) operation with elevated suction temperatures was documented in a GE Task Report (Reference 3). The review indicated RCIC could continue to operate up to approximately 230°F suction temperature. Other than size, RCIC and HPCI are similar. Each utilizes steam from the reactor to provide motive force for a turbine that drives a pump to supply water to the reactor. RCIC and HPCI are also similar in terms of bearing materials. Additionally DEOP 200-1, Primary Containment Control (Reference 4, Figure Y) identifies HPCI flow as high as 3000 gpm is allowed with a Torus Bottom Pressure of 10 psig if suppression pool temperature is 200 °F (MAAP analysis indicates Containment Pressure provides in excess of 10 psig suction pressure (wetwell chamber pressure) to the HPCI pump shortly after event initiation.). Based on the review of Reference 3 and DEOP 200-1, it is assumed that HPCI would continue to operate at 200°F suppression pool temperature. Further review and analysis will be performed to support this assumption. The information will be provided in a future update if changes to the Dresden plan are required. Utilization of this assumption and the MAAP

	results indicates 6.5 hours of continuous HPCI operation is available in Phase 1. ITEM #22 Spent Fuel Pool (SFP) makeup is not a time constraint with the initial condition of Mode 1 at 100% power, since the worst case fuel pool heat load conditions only exist during a refueling outage. Under non-outage conditions, the maximum SFP heat load is 14.912 MBtu/hr. Loss of SFP cooling with this heat load and an initial SFP temperature of 150 degrees F results in a time to boil of 9.54 hours, and 110.07 hours to the top of active fuel. Therefore, completing the equipment line-up for initiating SFP make-up at 12 hours into the event ensures adequate cooling of the spent fuel is maintained. The worst case SFP heat load during an outage is 39.688 MBtu/hr. Loss of SFP cooling with this heat load and an initial SFP temperature of 150 degrees F results in a time to boil of 3.58 hours, and 41.36 hours to the top of active fuel. With the entire core being located in the SFP, manpower resources normally allocated to core cooling along with the Operations outage shift manpower can be allocated to aligning SFP makeup which ensures the system alignment can be established prior to the point at which SFP conditions become challenged. Therefore, completing the equipment line-up for initiating SFP makeup at 8 hours into the event ensures adequate cooling of the spent fuel is maintained. Initial calculations were used to determine the fuel pool timelines (Reference 5). Formal calculations will be performed to validate this information during development of the spent fuel pool cooling strategy detailed design, and will be provided in a future six (6) month update. References 1. DR-MISC-043 Revision 0, MAAP Analysis to Support FLEX Initial Strategy. 2. DIS 2300-07, Rev 20, HIGH PRESSURE COOLANT INJECTION AREA TEMPERATURE SWITCH CALIBRATION. 3. GE Task Report 0000-0143-0382-R0, RCIC System Operation in Prolonged Station Blackout – Feasibility Study, January 2012 4. DEOP 200-1, Primary Containment Control, Revision 10 5. EC 371913, Revision 2,: Time-to-Boil Curves

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.* Deployment of FLEX is expected for all modes of operation. Transportation routes will be developed from the equipment storage area to the FLEX staging areas. An administrative program will be developed to ensure pathways remain clear or compensatory actions will be implemented to ensure all strategies can be deployed during all modes of operation. This administrative program will also ensure the strategies can be implemented in all modes by maintaining the portable FLEX equipment available to be deployed during all modes. Identification of storage and creation of the administrative program are open items. Closure of these items will be documented in a six (6) month update.

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
	
	Exelon Generation Company, LLC (Exelon) fully expects to meet the site implementation/compliance dates provided in Order EA-12-049 with no exceptions. Any changes or additions to the planned interim milestone dates will be provided in a future six (6) month update.

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.* DNPS will implement an administrative program for FLEX to establish responsibilities, and testing & maintenance requirements. A plant system designation will be assigned to FLEX equipment which requires configuration controls associated with systems. This will establish responsibilities, maintenance and testing requirements for all components associated with FLEX. Unique identification numbers will be assigned to all components added to the FLEX plant system. Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11. Installed structures, systems and components pursuant to 10CFR50.63(a) will continue to meet the augmented quality guidelines of Regulatory Guide 1.155, Station Blackout. Standard industry PMs will be developed to establish maintenance and testing frequencies based on type of equipment and will be within EPRI guidelines. Testing procedures will be developed based on the industry PM templates and Exelon standards.
Describe training plan	*List training plans for affected organizations or describe the plan for training development* Training materials for FLEX will be developed for all station staff involved in implementing FLEX strategies. For accredited training programs, the Systematic Approach to Training, SAT, will be used to determine training needs. For other station staff, a training overview will be developed per change management plan.
Describe Regional Response Center plan	DNPS has contractual agreements in place with the Strategic Alliance for FLEX Emergency Response (SAFER). The industry will establish two (2) Regional Response Centers (RRC) to support utilities during beyond design basis events. Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. Equipment will be moved from an

	RRC to a local Assembly Area, established by the 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: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.	

Maintain Core Cooling

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

- **RCIC/HPCI/IC**
- **Depressurize RPV for injection with portable injection source**
- **Sustained water source**

BWR 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 (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time.

Power Operation, Startup, and Hot Shutdown

Reactor Level Control

Initial reactor water level control would be accomplished using the HPCI System which is independent of all AC power. Normal suction source for HPCI is the Condensate Storage Tanks (CST). Operation of the HPCI Turbine will result in a heat input to the Torus. There is no current method to remove heat from the Torus when AC power is not available. The CSTs are qualified for all criteria with the exception of tornado/high winds. If the CSTs are unavailable, HPCI suction can be transferred to the Torus (suppression pool). This would remain a viable source as long as 250VDC power is available. A preliminary review identifies the 250VDC batteries will operate for at least 6 hours before dropping to unacceptable voltage levels if deep load shed is performed. Further review and analysis will be performed to support this assumption. The information will be provided in a future update if changes to the Dresden plan are required. After 250VDC battery depletion, HPCI is assumed to be not available as essential support motors (such as Gland Seal Leak-off (GSLO) Drain Pump and the GSLO Condenser Exhauster) lose power.

With continuous HPCI operation MAAP analysis (Reference 1) indicates suppression pool temperature reaches 140°F approximately 2.5 hours after event initiation and 200°F after approximately 6.5 hours. The Dresden UFSAR (Reference 2, Section 6.3.2.3) identifies continued operation of HPCI above a suppression pool temperature of 140°F is not permitted for continued operability based on lube oil heat exchanger performance and pump net positive suction head. A BWROG review of RCIC operation with elevated suction temperatures was documented in a GE Task Report (Reference 3) following the events at Fukushima-Daiichi. The review indicated RCIC could continue to operate up to approximately 230°F suction temperature. Other than size, HPCI and RCIC are similar systems. Each utilizes steam from the reactor to provide motive force for a turbine that drives a pump to supply water to the reactor. RCIC and HPCI are also similar in terms of bearing materials. Additionally DEOP 200-1, Primary Containment Control (Reference 4, Figure Y) identifies HPCI flow as high as 3000 gpm is allowed with a Torus Bottom Pressure of 10 psig if suppression pool temperature is 200°F (MAAP analysis indicates Containment Pressure provides in excess of 10 psig suction pressure (wetwell chamber pressure) to the HPCI 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.

shortly after event initiation.). Based on the review of Reference 3 and DEOP 200-1, it is assumed that HPCI would continue to operate at 200°F suppression pool temperature. Further review and analysis will be performed to support this assumption. The information will be provided in a future update if changes to the Dresden plan are required. Utilization of this assumption and the MAAP results indicates 6.5 hours of continuous HPCI operation is available in Phase 1.

Pressure Control

As described in the Dresden UFSAR (Reference 2, Section 5.4.6.), the Isolation Condenser (IC) provides RPV pressure control in the event that the reactor becomes isolated from the turbine and the main condenser. The IC was designed for a cooling rate of 252.5 x 10^6 Btu/hr and is capable of operation without AC electrical power and operates by natural circulation. Steam flow from the reactor condenses in the tubes of the heat exchanger and returns by gravity to the reactor in a closed loop. The differential water head, created when the steam is condensed, serves as the driving force. Shell side water is boiled and vented to atmosphere outside the Reactor Building. Makeup water for the IC shell-side is normally supplied from the clean demineralized water storage tank via one of two diesel driven isolation condenser makeup water pumps. Per the UFSAR (Reference 2, Section 5.4.6.3), the Isolation Condenser will operate approximately 20 minutes without initiation of shell-side makeup. In Phase 1 there are no shell-side makeup sources that meet requirements for FLEX qualification. Therefore, the Isolation Condenser must be secured within 20 minutes of initiation to prevent possible damage from operation with inadequate shell-side level.

Operation of the HPCI System removes heat from the RPV. This heat removal will be used to maintain RPV pressure after the Isolation Condenser is secured. As previously mentioned, operation of the HPCI turbine will result in a heat input to the Torus.

After HPCI is lost, the Target Rock Safety Relief Valve will operate to control RPV pressure. The Target Rock Safety Relief Valve releases steam from the RPV to the Suppression Pool under the water. This results in a loss of RPV inventory and a heat addition to the Suppression Pool.

Overall Response

The MAAP (Reference 1) was utilized to evaluate overall response of installed systems per the system utilization described above. With continuous HPCI operation for 6 hours MAAP analysis indicates suppression pool temperature reaches 140°F approximately 2.5 hours after event initiation and 200°F after approximately 6.5 hours. MAAP case DR_FLEX_CASE2 (Reference 1) most closely resembles the expected system response. Following the loss of HPCI as an injection source due to battery voltage levels dropping below acceptable levels or suppression pool temperature exceeding 200 °F and assuming the Isolation Condenser is unavailable without a shell side make up source; water level in the RPV reaches the top of active fuel approximately 10.6 hours after event initiation. The reactor water inventory loss is due to operation of the Target Rock Safety Relief Valve for reactor pressure control after HPCI operation ceases and recirculation pump normal seal leakage. Primary Containment pressure reaches design pressure approximately 14-15 hours after the event.

Based on the above information, the coping time for Dresden Station using installed equipment is 10.6 hours when core uncovery occurs.

Additionally MAAP analysis (Reference 1, DR_FLEX_CASE2) identified the Heat Capacity Temperature Limit (HCTL) is reached approximately 6 hours into the event and the Pressure Suppression Pressure is reached approximately 12 hours into the event. Per pending changes to the EPGs and BWR Owner's Group (BWROG) guidance, EOPs will be changed to allow termination of RPV emergency depressurization at these points to allow continued HPCI operation, because steam driven HPCI is the sole means of core cooling (BWROG EOP Revision EPG/SAG Rev.3). Once the IC is placed back in service at 6 hours into the event, it is expected the reactor will be cooled and depressurized with the use of the IC.

Cold Shutdown and Refueling

When in Cold Shutdown and Refueling, many variables exist which impact the ability to cool the core. In the event of an ELAP during these Modes, installed plant systems cannot be relied upon to cool the core; thus, transition to Phase 2 will begin immediately. All efforts will be made to expeditiously provide core cooling and minimize heat-up and re-pressurization. Exelon has a program in place (References 5 and 6) to determine the time to boil for all conditions during shutdown periods. This time will be used to determine the time required to complete transition to Phase 2.

To accommodate the activities of vessel disassembly and refueling, water levels in the reactor vessel and the reactor cavity are often changed. The most limiting condition is the case in which the reactor head is removed and water level in the vessel is at or below the reactor vessel flange. If an ELAP/LUHS occurs during this condition then (depending on the time after shutdown) boiling in the core may occur quite rapidly.

Deploying and implementing portable FLEX pumps to supply injection flow must commence immediately from the time of the event. This should be plausible because more personnel are on site during outages to provide the necessary resources. Strategies for makeup water include deploying a FLEX pump to take suction from the UHS as described in the Phase 2 Core Cooling section.

Guidance will be provided to ensure that sufficient area is available for deployment and that haul paths remain accessible without interference from outage equipment during refueling outages.

References:

1. DR-MISC-043 Revision 0, MAAP Analysis to Support FLEX Initial Strategy.
2. Dresden Nuclear Power Station Updated Final Safety Analysis Report, Revision 9
3. GE Task Report 0000-0143-0382-R0, RCIC System Operation in Prolonged Station Blackout – Feasibility Study, January 2012
4. DEOP 200-1, Primary Containment Control, Revision 10
5. OU-AA-103, Shutdown Safety Management Program
6. EC 371913, Revision 2,: Time-to-Boil Curves

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

/ Strategies / Guidelines	Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs. At the initiation of the event personnel will enter DGA 12, Partial or Complete Loss of AC Power, and Emergency Operating Procedures (EOPs). DGA-12 provides direction for SBO events and will direct Operations personnel to perform DC Load shedding to extend battery availability. Personnel will utilize High Pressure Coolant Injection (HPCI) and Isolation Condenser (IC) for initial reactor pressure and level control as described above. Procedures exist to operate installed plant equipment such as HPCI and the IC. Direction is provided for actions such as DC Load Shedding in station procedures.
Identify modifications	*List modifications* There are no modifications required to support Phase 1 response.
Key Reactor Parameters	*List instrumentation credited for this coping evaluation.* • **RPV Level** Instrument — Power supply LI 2-640-29A(B) — ESS (via Digital FWLC). 250VDC supply LI 3-640-29A(B) — ESS (via Digital FWLC) 250VDC supply LI 2-263-59A(B) — N/A, Local instruments, no power required LI 3-263-59A(B) — N/A, Local instruments, no power required LI 2-263-151A(B) — N/A, Local instruments, no power required LI 3-263-151A(B) — N/A, Local instruments, no power required • **RPV Pressure** Instrument — Power supply PI 2-263-156 — 125VDC 2A1 PI 3-263-156 — 125VDC 3A1 PI 2-263-60A(B) — N/A, Local instruments, no power required PI 3-263-60A(B) — N/A, Local instruments, no power required PI 2-263-139A(B) — N/A, Local instruments, no power required PI 3-263-139A(B) — N/A, Local instruments, no power required • **Isolation Condenser Shell-side Level** Instrument — Power supply 2-1301-644 — N/A, Local sight-glass, no power required

	3-1301-644 N/A, Local sight-glass, no power required DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.	

Maintain Core Cooling

BWR 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 (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time.

Dresden-specific inputs and the MAAP 4.0.5 computer code are used to calculate plant response to several scenarios to analyze this event as documented in DR-MISC-043 Revision 0 (Reference 1). Case DR_FLEX_CASE5 best represents the postulated conditions where the Reactor Recirculation Pump seal leak is 12.5 gpm.

Station personnel will line-up portable equipment to supply shell-side makeup to the Isolation Condenser (IC) and re-energize the 125V and 250VDC Battery Chargers. If the IC is placed in service prior to HPCI being secured, the core will remain covered for at least 72 hours without makeup. The only inventory losses during this time will be the assumed 12.5 gpm leakage from the Reactor Recirculation Pump seals.

Personnel will also line-up RPV inventory makeup sources supplied by portable equipment.

Mechanical strategy conceptual designs contain features to expedite and simplify implementation, and may not be required in order to meet the event timeline for maintaining the safety function requirements of NEI 12-06.

RPV Pressure Control

Dresden will utilize portable equipment to provide shell-side makeup to the IC prior to the loss of HPCI as an RPV Pressure Control mechanism. Utilization of the IC as the RPV Pressure Control mechanism will eliminate the need for ERV operation and the subsequent RPV inventory loss/Suppression Pool heat addition.

Shell-side makeup to the IC will be established using portable pumps. The pump suction will be from the Ultimate Heat Sink (UHS). Pump discharge will be directed through fire hoses routed from the area near the cribhouse either through the turbine building or around the Protected Area access road to the south east side of the Reactor Building. At this location the hose can be connected to one of two proposed locations.

1. Primary Strategy
   The first proposed strategy is associated with the currently installed IC Makeup Pump discharge line. A new tap will be installed on the 8" combined discharge piping of the IC Makeup Pumps in the basement of the makeup pump house. This tap would include a check valve, gate valve, and quick hose connection to connect to pipe line 2/3-43218-8".

2. Alternate Strategy
   The second proposed strategy is associated with the currently installed secondary containment penetration valve 2-1699-125. A new check valve, gate valve, and quick hose

Maintain Core Cooling

BWR Portable Equipment Phase 2:

connection will be installed in place of the blank flange that is currently on the exterior of the Unit 2 Reactor Building. New qualified, seismically mounted pipe will be installed downstream of the 2-1699-125 valve and run up to the 589' elevation. A secondary tap, including a gate valve, quick hose connection, and expander, will be installed on the new line above the probable maximum flood level so as to use this line during a flood condition. On the 589' Elevation the new line will split into two lines, one available for the Isolation Condenser for each Unit. The line at each IC will terminate with a gate valve, and quick hose connection. A hose would then be used to connect the line to a newly installed tap in the IC Condensate Transfer shell-side supply line equipped with a check valve, gate valve, and quick hose connection.

Connection of a FLEX pump via a hose to one of the three proposed quick hose connections (IC Makeup Pump Building basement, on the 517' elevation, or on the 545' elevation) allows water from the UHS (or flood water, during a beyond-design basis flood) to be supplied directly to the IC shells with minimal impact on the staffing requirements at Dresden. Connection of a FLEX pump via a hose to one of the quick hose connections on the 589' Elevation is also possible, but would result in increased staffing impact due to laying long lengths of hose from the 589' Elevation to the location in which the FLEX pump is staged.

These modifications are in diverse locations, and the connection points and piping are qualified for the five Beyond Design Basis External Events (BDBEEs) that must be considered for implementation of FLEX. Additionally, these modifications are designed to supply both the Unit 2 IC and the Unit 3 IC simultaneously.

RPV Makeup

The primary injection method to the RPV is HPCI, whose primary water source is the Contaminated Condensate Storage Tank (CST). However, when the CST is unavailable, HPCI switches suction to the suppression pool. Eventually, 250 VDC battery depletion or increased suppression pool temperature renders the suppression pool unavailable as a HPCI suction source. Additionally, reactor pressure (i.e., decay heat) may become insufficient to drive the HPCI turbine. Therefore, an alternate makeup water source is required.

The alternate makeup water source for direct RPV injection involves using a FLEX pump and water from the UHS (Intake canal). The FLEX pump will take suction from the UHS. Pump discharge will be directed through fire hoses routed from the area near the cribhouse either through the turbine building or around the Protected Area access road to the south side of the Reactor Building. At this location the hose can be connected to one of two proposed locations.

1. Primary Strategy
   The first proposed strategy is associated with the currently installed Integrated Leak Rate Test connection (ILRT) Air Compressor Flange on the 2/3-1699-115, U2/3 RBX SECONDARY CNMT PENETRATION VLV EL 517' OUTSIDE WEST. The portable

Maintain Core Cooling

BWR Portable Equipment Phase 2:

pump will be connected at the flange outside the reactor building. Inside the reactor building connections will be made to allow injection into either reactor vessel using the lower drywell spray headers and the LPCI systems.

Unit 2
A new check valve, gate valve, and quick hose connection will be installed on the flanged connection between MO 2-1501-28A and MO 2-1501-27A. A new check valve, gate valve, and quick hose connection will also be installed on the ILRT line near the lower drywell spray line. A hose would then be utilized to connect the two lines together. Water would flow from the FLEX pump discharge, through the 2/3-1699-115 valve, through the hose between the new connections and into the LPCI System. Installed valves in the system would then be manually operated, if necessary, to direct water into the reactor vessel.

Unit 3
A new check valve, gate valve, and quick hose connection will be installed on the flanged connection between MO 3-1501-28B and MO 3-1501-27B. A new check valve, gate valve, and quick hose connection will also be installed on the ILRT line near the lower drywell spray line. A hose would then be utilized to connect the two lines together. Water would flow from the FLEX pump discharge, through the 2/3-1699-115 and 3-1699-128, U3 RBX SECONDARY CNMT PENETRATION VLV EL. 517' SOUTHWEST - VLV #2, valves, through the "U" shaped ILRT spool piece at the 3-1699-128, through the hose between the new connections and into the LPCI System. Installed valves in the system would then be manually operated, if necessary, to direct water into the reactor vessel.

2. Alternate Strategy
The second proposed strategy is associated with a similar flow path for the upper drywell spray headers and the LPCI system.

Unit 2
A new check valve, gate valve, and quick hose connection will be installed on the flanged connection between MO 2-1501-28B and MO 2-1501-27B. A hose would then be routed directly from the FLEX Pump discharge to the new flanged connection. Water would flow from the FLEX Pump, through the new connection and into the LPCI System at the upper drywell spray header. Installed valves in the system would then be manually operated, if necessary, to direct water into the reactor vessel.

Unit 3
A new check valve, gate valve, and quick hose connection will be installed on the flanged connection between MO 3-1501-28A and MO 3-1501-27A. A hose would then be routed directly from the FLEX Pump discharge to the new flanged connection. Water would flow from the FLEX Pump, through the new connection and into the LPCI System at the upper drywell spray header. Installed valves in the system would then be manually operated, if necessary, to direct water into the reactor vessel.

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
It is expected that continued use of the Isolation Condenser for RPV heat removal/pressure control, with the FLEX pump available for injection into the RPV, will provide long-term core cooling without the need for offsite equipment. References: 1. DR-MISC-043 Revision 0, MAAP Analysis to Support FLEX Initial Strategy.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* 1. Installation of new piping and associated connections, valve and flanges to provide one path for IC shell-side makeup using a portable pump. (see Attachment 3 Figure 1) 2. Installation of new connection points in the existing IC shell-side makeup line to allow for the connection of a portable pump. This will provide another source of shell-side makeup. (see Attachment 3 Figure 1) 3. Modifications to minimize the time required for station personnel to route discharge hose from a portable pump staged near the Cribhouse to the proposed connection points for IC shell-side makeup. 4. Installation of new connection points associated with the ILRT and LPCI Lower Drywell Spray piping to provide RPV makeup using a portable pump. (see Attachment 3 Figure 2) 5. Installation of new connection points associated with the LPCI Upper Drywell Spray piping to provide RPV makeup using a portable pump. (see Attachment 3 Figure 2)

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* • **RPV Level** Instrument — Power supply LI 2-640-29A(B) — ESS (via Digital FWLC) 250VDC supply LI 3-640-29A(B) — ESS (via Digital FWLC) 250VDC supply LI 2-263-59A(B) — N/A, Local instruments, no power required LI 3-263-59A(B) — N/A, Local instruments, no power required LI 2-263-151A(B) — N/A, Local instruments, no power required LI 3-263-151A(B) — N/A, Local instruments, no power required • **RPV Pressure** Instrument — Power supply PI 2-263-156 — 125VDC 2A1 PI 3-263-156 — 125VDC 3A1 PI 2-263-60A(B) — N/A, Local instruments, no power required PI 3-263-60A(B) — N/A, Local instruments, no power required PI 2-263-139A(B) — N/A, Local instruments, no power required PI 3-263-139A(B) — N/A, Local instruments, no power required • **Isolation Condenser Shell-side Level** Instrument — Power supply 2-1301-644 — N/A, Local sight-glass, no power required 3-1301-644 — N/A, Local sight-glass, no power required DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
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* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS. FLEX equipment can be stored below flood level at DNPS since sufficient warning time is available to relocate and/or deploy the equipment. Plant procedures/guidance will be developed to address the needed actions. FLEX equipment will be relocated to a position that is protected from the flood, either by barriers or by elevation, prior to the arrival of the potentially damaging flood levels. Both electrical and at least one mechanical FLEX connection locations will be above the flood plain. At least one fuel oil storage tank will be protected from flood conditions.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Storage location and structure have not yet been decided. A portable diesel powered FLEX pump will be transported from the storage location to an area near the Cribhouse. Suction hose will be installed from the UHS to the pump suction. Pump discharge will be directed through fire hoses routed either through the turbine building or around the Protected Area access road to the south side of the Reactor Building. At this location the hose can be connected to the proposed locations described above.	Modifications will be installed to expedite hose routing through security fences.	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements. Preliminary review indicates the external water connections will need to be in diverse locations so there is reasonable assurance that at least one connection will be available during the applicable beyond design basis external events.

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be

Maintain Core Cooling
BWR Portable Equipment Phase 2:
performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

<table>
<tr><td colspan="2">Maintain Core Cooling</td></tr>
<tr><td colspan="2">BWR Portable Equipment Phase 3:</td></tr>
<tr><td colspan="2">Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC) and strategy(ies) utilized to achieve this coping time.

Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required.

Phase 3 equipment for DNPS includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal and RCS Inventory Control. The portable generators will be capable of providing the necessary 480 volt power requirements as outlined in Phase 2 response for Safety Functions Support.</td></tr>
<tr><td colspan="2">Details:</td></tr>
<tr><td>Provide a brief description of Procedures / Strategies / Guidelines</td><td>Confirm that procedure/guidance exists or will be developed to support implementation

DNPS will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.</td></tr>
<tr><td>Identify modifications</td><td>List modifications

None.</td></tr>
<tr><td>Key Reactor Parameters</td><td>List instrumentation credited or recovered for this coping evaluation.

• RPV Level
<u>Instrument</u> — <u>Power supply</u>
LI 2-640-29A(B) — ESS (via Digital FWLC) 250VDC supply
LI 3-640-29A(B) — ESS (via Digital FWLC) 250VDC supply
LI 2-263-59A(B) — N/A, Local instruments, no power required
LI 3-263-59A(B) — N/A, Local instruments, no power required
LI 2-263-151A(B) — N/A, Local instruments, no power required
LI 3-263-151A(B) — N/A, Local instruments, no power required

• RPV Pressure
<u>Instrument</u> — <u>Power supply</u>
PI 2-263-156 — 125VDC 2A1
PI 3-263-156 — 125VDC 3A1</td></tr>
</table>

Maintain Core Cooling

BWR Portable Equipment Phase 3:

PI 2-263-60A(B)	N/A, Local instruments, no power required
PI 3-263-60A(B)	N/A, Local instruments, no power required
PI 2-263-139A(B)	N/A, Local instruments, no power required
PI 3-263-139A(B)	N/A, Local instruments, no power required

- **Isolation Condenser Shell-side Level**

Instrument	Power supply
2-1301-644	N/A, Local sight-glass, no power required
3-1301-644	N/A, Local sight-glass, no power required

DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.

Deployment Conceptual Modification
(Attachment 3 contains Conceptual Sketches)

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

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Containment

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

- **Containment Venting or Alternate Heat Removal**
- **Hydrogen Igniters (Mark III containments only)**

BWR 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 vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time.

At the initiation of the event personnel will enter DGA 12, Partial or Complete Loss of AC Power, and Emergency Operating Procedures (EOPs). Reactor water level and pressure control would be accomplished using the HPCI System which is independent of all AC power. Operation of the HPCI Turbine will result in a heat input to the Torus. There is no current method to remove heat from the Torus without AC power. HPCI will remain a viable system as long as 250VDC power is available (estimated time before the 250VDC batteries are depleted below an acceptable level is 6 hours).

Once the IC has been re-initiated, the HPCI system can be secured. The IC removes decay heat with no loss of inventory from the reactor coolant system (although there still may be some leakage from the recirculation pump seals), and with no addition of heat to the suppression pool. As long as the shell side of the IC is replenished (Phase 2) with sufficient water, the IC will remove adequate decay heat to maintain core cooling. MAAP analysis (Reference 1, DR_FLEX_CASE5) performed identified drywell pressure would be approximately 25 psig at 6 hours from the start of the event, at which time, IC would be re-initiated and HPCI secured.

During Phase 1, containment integrity is maintained by normal design features of the containment, such as the containment isolation valves. In accordance with NEI 12-06 (Reference 2, Section 3.2.1.11), the containment is assumed to be isolated following the event.

Reliable Hardened Vent System (RHVS) will be available for use to vent containment. Procedures (References 3, 4 and 5) will be revised to provide the required directions to accomplish this task. Monitoring of containment (drywell) pressure and temperature will be available via normal plant instrumentation. Early venting of the containment (BWROG EOP Revision EPG/SAG Rev.3) will serve to limit containment pressure rise and Torus temperature rise, which will allow for long term operation of the HPCI System.

References:

1. DR-MISC-043 Revision 0, MAAP Analysis to Support FLEX Initial Strategy.
2. Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", NEI 12-06,

[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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3. DEOP 0200-01, Primary Containment Control
4. DOA 1600-09, Emergency Containment Venting
5. DEOP 500-4, Containment Venting

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* NRC Order EA-12-050, Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents.
Key Containment Parameters	*List instrumentation credited for this coping evaluation.* • **Containment Pressure** Instrument — Power supply PI 2-1640-5 — ESS (250VDC supply) PI 3-1640-5 — ESS (250VDC supply) PR/FR 2-8540-2/4 — ESS (250VDC supply) PR/FR 3-8540-2/4 — ESS (250VDC supply) • **Suppression Pool Level** Instrument — Power supply LI 2-1602-3 — 125VDC 2B1 LI 3-1602-3 — 125VDC 3B1 Local Sight glass — N/A, Local instruments, no power required • **Suppression Pool Temperature** There are no instruments that meet the NEI 12-06 requirements. Temperature will be taken locally at the torus using surface pyrometer. DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.

Notes:
Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Containment

BWR 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 vent or alternative / Hydrogen Igniters)and strategy(ies) utilized to achieve this coping time.

Dresden will utilize portable equipment to provide shell-side makeup to the IC prior to the loss of HPCI. Utilization of the IC as the RPV Pressure Control mechanism will eliminate the need for ERV operation and the subsequent heat addition to the containment.

Mechanical strategy conceptual designs contain features to expedite and simplify implementation, and may not be required in order to meet the event timeline for maintaining the safety function requirements of NEI 12-06.

Shell-side makeup to the IC will be established using portable pumps. The pump suction will be from the Ultimate Heat Sink (UHS). Pump discharge will be directed through fire hoses routed from the area near the cribhouse either through the turbine building or around the Protected Area access road to the south east side of the Reactor Building. At this location the hose can be connected to one of two proposed locations.

1. Primary Strategy
   The first proposed strategy is associated with the currently installed IC Makeup Pump discharge line. A new tap will be installed on the 8" combined discharge piping of the IC Makeup Pumps in the basement of the makeup pump house. This tap would include a check valve, gate valve, and quick hose connection to connect to pipe line 2/3-43218-8".

2. Alternate Strategy
   The second proposed strategy is associated with the currently installed secondary containment penetration valve 2-1699-125. A new check valve, gate valve, and quick hose connection will be installed in place of the blank flange that is currently on the exterior of the Unit 2 Reactor Building. New qualified, seismically mounted pipe will be installed downstream of the 2-1699-125 valve and run up to the 589' elevation. A secondary tap, including a gate valve, quick hose connection, and expander, will be installed on the new line above the probable maximum flood level so as to use this line during a flood condition. On the 589' Elevation the new line will split into two lines, one available for the Isolation Condenser for each Unit. The line at each IC will terminate with a gate valve, and quick hose connection. A hose would then be used to connect the line to a newly installed tap in the IC Condensate Transfer shell-side supply line equipped with a check valve, gate valve, and quick hose connection.

Connection of a FLEX pump via a hose to one of the three proposed quick hose connections (IC Makeup Pump Building basement, on the 517' elevation, or on the 545' elevation) allows water from the UHS (or flood water, during a beyond-design basis flood) to be supplied directly to the IC shells with minimal impact on the staffing requirements at Dresden. Connection of a FLEX pump via a hose to one of the quick hose connections on the 589' Elevation is also possible, but would result in increased staffing impact due to laying long lengths of hose from the 589' Elevation to the

Maintain Containment	
BWR Portable Equipment Phase 2:	
location in which the FLEX pump is staged. These modifications are in diverse locations, and the connection points and piping are qualified for the five BDBEEs that must be considered for implementation of FLEX. Additionally, these modifications are designed to supply both the Unit 2 IC and the Unit 3 IC simultaneously. Phase 2 of containment integrity is maintained throughout the duration of the event.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* 1. Installation of new connection points in the existing IC shell-side makeup line to allow for the connection of a portable pump. This will provide another source of shell-side makeup. (see Attachment 3 Figure 1) 2. Installation of new piping and associated connections, valve and flanges to provide one path for IC shell-side makeup using a portable pump. (see Attachment 3 Figure 1)
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* • **Containment Pressure** Instrument — Power supply PI 2-1640-5 — ESS (250VDC supply) PI 3-1640-5 — ESS (250VDC supply) PR/FR 2-8540-2/4 — ESS (250VDC supply) PR/FR 3-8540-2/4 — ESS (250VDC supply) • **Suppression Pool Level** Instrument — Power supply LI 2-1602-3 — 125VDC 2B1 LI 3-1602-3 — 125VDC 3B1 Local Sight glass — N/A, Local instruments, no power required

Maintain Containment	
BWR Portable Equipment Phase 2:	
	• **Suppression Pool Temperature** There are no instruments that meet the NEI 12-06 requirements. Temperature will be taken locally at the torus using surface pyrometer. • **Isolation Condenser Shell-side Level** <u>Instrument</u> <u>Power supply</u> 2-1301-644 N/A, Local sight-glass, no power required 3-1301-644 N/A, Local sight-glass, no power required DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
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* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS. FLEX equipment can be stored below flood level at DNPS since

Maintain Containment	
BWR Portable Equipment Phase 2:	
	sufficient warning time is available to relocate and/or deploy the equipment. Plant procedures/guidance will be developed to address the needed actions. FLEX equipment will be relocated to a position that is protected from the flood, either by barriers or by elevation, prior to the arrival of the potentially damaging flood levels. Both electrical and at least one mechanical FLEX connection locations will be above the flood plain. At least one fuel oil storage tank will be protected from flood conditions.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.

Maintain Containment		
BWR Portable Equipment Phase 2:		
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*
Storage location and structure have not yet been decided. A portable diesel powered FLEX pump will be transported from the storage location to an area near the Cribhouse. Suction hose will be placed in the UHS and connected to the pump suction. Pump discharge will be directed through fire hoses routed either through the turbine building or around the Protected Area access road to the south side of the Reactor Building. At this location the hose can be connected to the proposed locations described above.	Modifications will be installed to expedite hose routing through security fences.	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements. Preliminary review indicates the external water connections will need to be in diverse locations so there is reasonable assurance that at least one connection will be available during the applicable beyond design basis external events.

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Containment

BWR 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 vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time.

Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required.

Phase 3 equipment for DNPS includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal and RCS Inventory Control. The portable generators will be capable of providing the necessary 480 volt power requirements as outlined in Phase 2 response for Safety Functions Support.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* DNPS will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* None
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.

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*
None	None	None

Maintain Containment
BWR Portable Equipment Phase 3:
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Spent Fuel Pool Cooling
Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **Makeup with Portable Injection Source**
BWR 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 with portable injection source)and strategy(ies) utilized to achieve this coping time. **There are no Phase 1 actions required at this time that need to be addressed.** The spent fuel pool has been designed to withstand the anticipated earthquake loadings as a Class I structure. Each unit has its own spent fuel pool measuring 33 ft x 41 ft. Each pool is a reinforced concrete structure, completely lined with seam-welded stainless steel plates welded to reinforcing members (channels, I beams, etc.) embedded in concrete. The normal depth of water in the spent fuel pool is 37 feet, 9 inches and the depth of water in the transfer canal during refueling is 22 feet, 9 inches. (Reference 1, Section 9.1.2.2.3) EC 371913 (Reference 2) was revised to incorporate a review of Spent Fuel Pool response to an ELAP. At initial conditions, the spent fuel pool is at 19 ft above the top of active fuel (minimum level per Tech Spec). The loss of all AC Power Sources causes a loss of forced circulation and heat removal. Spent Fuel Pool (SFP) makeup is not a time constraint with the initial condition of Mode 1 at 100% power, since the worst case fuel pool heat load conditions only exist during a refueling outage. Under non-outage conditions, the maximum SFP heat load is 14.912 MBtu/hr. Loss of SFP cooling with this heat load and an initial SFP temperature of 150 degrees F results in a time to boil of 9.54 hours, and 110.07 hours to the top of active fuel. Therefore, completing the equipment line-up for initiating SFP makeup at 12 hours into the event ensures adequate cooling of the spent fuel is maintained. The worst case SFP heat load during an outage is 39.688 MBtu/hr. Loss of SFP cooling with this heat load and an initial SFP temperature of 150 degrees F results in a time to boil of 3.58 hours, and 41.36 hours to the top of active fuel. With the entire core being located in the SFP, manpower resources normally allocated to core cooling along with the Operations outage shift manpower can be allocated to aligning SFP makeup which ensures the system alignment can be established prior to the point at which SFP conditions become challenged. Therefore, completing the equipment line-up for initiating SFP makeup at 8 hours into the event ensures adequate cooling of the spent fuel is maintained.

[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.

Evaluation of the spent fuel pool area for steam and condensation has not yet been performed. The results of this evaluation and the vent path strategy, if needed, will be provided in a future six (6) month update.

References:

1. Dresden Nuclear Power Station Updated Final Safety Analysis Report, Revision 9
2. EC 371913, Revision 2,: Time-to-Boil Curves

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	The station procedure to respond to a loss of cooling in the spent fuel pool is DOA 1900-01 "Loss of Fuel Pool Cooling". Furthermore, time-to-boil curves are contained in Attachments O and P of OP-DR-104-1001 "Shutdown Risk Management Contingency Plans", which were prepared in accordance with OP-AA-108-117-1001 "Spent Fuel Storage Pools Heat-Up Rate with Loss of Normal Cooling". Inputs and assumptions are identified in EC EVAL 371913, Rev. 2, "Time-to-Boil Curves." Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify any equipment modifications	N/A
Key SFP Parameter	Spent Fuel Pool Level Instrumentation will be installed in accordance with NRC Order EA 12-051. DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Spent Fuel Pool Cooling	
BWR 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 with portable injection source) and strategy(ies) utilized to achieve this coping time. Mechanical strategy conceptual designs contain features to expedite and simplify implementation, and may not be required in order to meet the event timeline for maintaining the safety function requirements of NEI 12-06. Dresden Nuclear Power Station (DNPS) personnel will line-up the FLEX diesel driven portable pump to supply water to the spent fuel pool (SFP). The pump suction will be from the Ultimate Heat Sink (UHS). Pump discharge will be directed through fire hoses routed from the area near the cribhouse either through the turbine building or around the Protected Area access road to the south east side of the Reactor Building A hose will be connected to a proposed modification on the SFP cooling discharge header. This modification of the SFP cooling discharge header will consist of connecting into the Shutdown Cooling (SDC) connection to the SFP return. A new manual valve and check valve along with appropriate piping will be installed for this strategy. Opening installed manual valve 2(3)-1901-64 then provides a flow path into the fuel pool. Starting the Flex Pump and throttling the new manual valve at the connection being used (517' or 545' elevation) will control makeup flow into the spent fuel pool without accessing the refueling floor. Additionally, spray cooling of the fuel pool via portable monitor nozzles and makeup directly to the fuel pool using hoses on the refuel floor is available per 10CFR50.54 (hh)(2) requirements. Given the initial conditions of the FLEX event, the strategies will be required to utilize the pump suction lift mode with a water source such as a cooling canal or the UHS instead of a flooded suction from the fire header. DOP 0010-14 provides direction for use of the FLEX pump using suction lift from a source other than the fire header. EC 371626 (Reference 1) identifies the FLEX pump is capable of providing the required flows to each fuel pool when operating in the suction lift mode. Evaluation of the spent fuel pool area for steam and condensation has not yet been performed. The results of this evaluation and the vent path strategy, if needed, will be provided in a future six (6) month update. References: 1. EC 371626, Validation of Hydraulic Capabilities of B5B Pump	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* A seismically qualified header is proposed to be installed from the 545' elev. to the 517' elev. with a tee at the 545' elev., located near the North East Stairwell (Unit 2) and North West Stairwell (Unit 3). The header will have isolation valves near the stairwell on the 517' elev. and 545' elev. The 517' and 545' elevations will also have a hose connection for connecting the FLEX Diesel Driven Portable Pump. The 545' elev. line will make a connection with the SFP cooling return line from SDC, upstream of valve 2(3)-1901-64. Both the 517' elev. and the 545' elev. connections will have the hose connections to ensure this line can be used for all hazards applicable to Dresden. (see Attachment 3 Figure 4) Spent Fuel Pool Level Instrumentation will be installed in accordance with NRC Order EA 12-051.
Key SFP Parameter	Spent Fuel Pool Level Instrumentation will be installed in accordance with NRC Order EA 12-051. DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.

Maintain Spent Fuel Pool Cooling	
BWR 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* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS. FLEX equipment can be stored below flood level at DNPS since sufficient warning time is available to relocate and/or deploy the equipment. Plant procedures/guidance will be developed to address the needed actions. FLEX equipment will be relocated to a position that is protected from the flood, either by barriers or by elevation, prior to the arrival of the potentially damaging flood levels. At least one mechanical FLEX connection location for Spent Fuel Pool Makeup will be above the flood plain. At least one fuel oil storage tank will be protected from flood conditions.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.

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*
Storage location and structure have not yet been decided. A portable diesel powered FLEX pump will be transported from the storage location to an area near the Cribhouse. Suction hose will be placed in the UHS and connected to the pump suction. Pump discharge will be directed through fire hoses routed either through the turbine building or around the Protected Area access road to the south side of the Reactor Building. From this location the hose can be connected to the proposed SFP makeup header.	SFP Makeup header seismically mounted near the North East Stairwell (Unit 2) and North West Stairwell (Unit 3) RB stairwell. Header provides hard pipe connection from 517' elev. to the 545' elev. with isolation valves located near the stairwell to provide greater accessibility.	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements. Connections are located near the RB Stairwell which is in a Safety Related Structure.

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS

Maintain Spent Fuel Pool Cooling
BWR Portable Equipment Phase 2:
during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Spent Fuel Pool Cooling	
BWR 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 with portable injection source)and strategy(ies) utilized to achieve this coping time. Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required. Phase 3 equipment for DNPS includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Spent Fuel Pool Cooling. The portable generators will be capable of providing the necessary 480 volt power requirements as outlined in Phase 2 response for Safety Functions Support.	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* DNPS will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* None
Key SFP Parameter	DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.

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*
None	None	None

Maintain Spent Fuel Pool Cooling		
BWR Portable Equipment Phase 3:		

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Safety Functions Support

Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications.

BWR 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.

HPCI Room Habitability

Preliminary GOTHIC analysis indicates opening doors at 2 hours will result in acceptable room temperature values to support operation of HPCI for at least 6 hours. The GOTHIC analysis indicates the temperature is approximately 155°F after 6 hours which is below the lowest Group 4 Isolation Point of 162°F specified in DIS 2300-07 (Reference 1)

Main Control Room Habitability

In the event of an ELAP event Main Control Room Habitability will be maintained using the guidance of DOA 5750-1 (Reference 2, Attachment A). The actions entail opening multiple doors inside and outside the Main Control Room to establish an air flow path through the room. The applicable actions are initiated after Main Control Room temperature exceeds 95°F and are expected to maintain temperature less than 120°F.

Battery Room Ventilation

It is expected that the rise in temperature in the Safety Related Battery Rooms due to the loss of ventilation will not adversely affect the functionality of the batteries (Reference 3).

References:

1. DIS 2300-07, Rev 20, HIGH PRESSURE COOLANT INJECTION AREA TEMPERATURE SWITCH CALIBRATION.
2. DOA 5750-01, Ventilation System Failure, (Revision 58)
3. EC 350067, The effects of elevated temperatures on the Unit 3 Station Batteries.

[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.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Dresden Station will utilize the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications and describe how they support coping time.* None
Key Parameters	*List instrumentation credited for this coping evaluation phase.* DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.	

Safety Functions Support

BWR 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.

Electrical System Support and DC Battery availability

The 480VAC power distribution system provides power to the 120VAC Essential Safety Systems (ESS) buses at Dresden. The ESS buses provide power to critical loads for achieving and maintaining safe shutdown, such as battery chargers and instrument panels. The 480VAC power distribution system also consists of Non-ESS buses, which provide power to the Auxiliary Electrical Equipment Room (AEER) and Battery Room HVAC systems. Upon an ELAP, these services would be lost. If power cannot be restored, the ability of the plant to achieve and maintain safe shutdown during a BDBEE would be severely compromised.

The electrical strategy conceptual design contains features to expedite and simplify implementation, and may not be required in order to meet the event timeline for maintaining the safety function requirements of NEI 12-06. The following modifications are being proposed for Unit 2 to connect a portable generator to provide power to critical loads. In order to supply power to the Unit 3 critical loads, the modifications will need to be replicated for Unit 3, and a second portable generator will be used to supply power to the Unit 3 loads:

1. Primary strategy
   Install a seismically qualified, fused disconnect panel in the vicinity of Bus 28. One side of the fused disconnect panel will be connected to Bus 28 on the load side of the cross-tie breaker by using double lugs to stack the leads. The other side of the fused disconnect panel will have an installed cable to one of the areas in which the portable diesel generator will be staged. This end of the cable will end in the male half of a quick connection plug, which will be standard to coordinate with the connections supplied by the Regional Response Centers (RRCs). During a FLEX event, an operator will plug this cable into the staged portable diesel generator. An operator will then connect the fuses. Once this is completed, closing the tie breakers on Buses 28 and 29 will allow power to be supplied to the buses from the portable diesel generator. See Appendix 3 Figure 3 for a conceptual drawing of this modification.

2. Alternate strategy
   Install a second seismically qualified, fused disconnect panel in the vicinity of Bus 29. One side of the fused disconnect panel will be connected to Bus 29 on the load side of the cross-tie breaker by using double lugs to stack the leads. The other side of the fused disconnect panel will have an installed cable to the other area in which the portable diesel generator will be staged. This end of the cable will end in the male half of a quick connection plug, which will be standard to coordinate with the connections supplied by the Regional Response

Safety Functions Support

BWR Portable Equipment Phase 2

Centers (RRCs). During a FLEX event, an operator will plug this cable into the staged portable diesel generator. An operator will then connect the fuses. Once this is completed, closing the breakers on Buses 28 and 29 will allow power to be supplied to the buses from the portable diesel generator. See Appendix 3 Figure 3 for a conceptual drawing of this modification.

The proposed modifications will resolve the problem of supplying power to the Unit critical loads by providing operators with easy connections to facilitate use of a portable diesel generator. Supplying power to the critical loads will meet the requirements of NEI 12-06 for restoring 480VAC power. No additional modifications are required to supply power to the 480VAC power distribution system.

Fuel Oil Supply to Portable Equipment

Fuel oil to FLEX Pumps and Generators will be supplied by the quantity of fuel in the tanks located on the skids of the portable equipment. This will then be supplemented by fuel tanks contained on the back of the FLEX Truck. When required, fuel can then be pumped from the FLEX Truck storage tanks to the portable equipment.

If onsite diesel fuel reserves are needed to operate temporary equipment, the primary locations to obtain diesel fuel would be to pump fuel directly from the seismically qualified underground fuel oil storage tanks.

Main Control Room Habitability

Exelon Generation Company, LLC (Exelon) intends on maintaining the Operational command and control function within the Main Control Room. Habitability conditions will be evaluated and a strategy will be developed to maintain Main Control Room habitability. The strategy and associated support analyses will be submitted in a future six (6) month update.

Auxiliary Equipment Electric Room (AEER) and Battery Room Ventilation

Current DNPS procedures provide direction for loss of ventilation in various areas. Further evaluation will be conducted to determine if actions such as staging portable fans are required for long term ELAP. Any differences will be communicated in a future six (6) month update following identification.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Dresden Station will utilize the industry developed guidance from the

Safety Functions Support	
BWR Portable Equipment Phase 2	
	Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications necessary for phase 2* 1. Fused disconnect panel installation near Bus 28 (38) with associated cabling to provide for connection of a portable AC generator (see Attachment 3 Figure 3) 2. Fused disconnect panel installation near Bus 29 (39) with associated cabling to provide for connection of a portable AC generator (see Attachment 3 Figure 3)
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
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* Structures to provide protection of FLEX equipment will be

Safety Functions Support	
BWR Portable Equipment Phase 2	
	constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS. FLEX equipment can be stored below flood level at DNPS since sufficient warning time is available to relocate and/or deploy the equipment. Plant procedures/guidance will be developed to address the needed actions. FLEX equipment will be relocated to a position that is protected from the flood, either by barriers or by elevation, prior to the arrival of the potentially damaging flood levels. Both electrical and at least one mechanical FLEX connection locations will be above the flood plain. At least one fuel oil storage tank will be protected from flood conditions.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.

Safety Functions Support		
BWR Portable Equipment Phase 2		
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS.	
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*
Storage location and structure have not yet been decided. A portable diesel powered generator will be transported from the storage location to an area near the Reactor Building. Station personnel will route cabling from the generator to a connection point in the Reactor Building. Connection will be made at this point using a quick connector.	Fused disconnect panel installation near the applicable Bus with associated cabling to provide for connection of a portable AC generator.	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev. 0 protection requirements. Connections are proposed to be in the Reactor Building which is a Safety Related Structure.
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.		

Safety Functions Support	
BWR 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. Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required. Phase 3 equipment for DNPS includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal, RCS Inventory Control and Spent Fuel Pool Cooling. The portable generators will be capable of providing the necessary 480 volt power requirements as outlined in Phase 2 response for Safety Functions Support.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* DNPS will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications necessary for phase 3* None
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* DNPS' evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage (NEI 12-06 Rev. 0, Section 3.2.1.10) and any differences will be communicated in a future six (6) month update following identification.

Safety Functions Support		
BWR Portable Equipment Phase 3		
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*
None	None	None

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for DNPS during a scheduled six (6) month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Three (3) low pressure high capacity self prime pump	**X**	**X**	**X**			1300 gpm, 150 psig	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.
Three hose trailers	**X**	**X**	**X**			Contain hoses and fittings necessary to implement strategies associated with portable pumps.	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Three (3) 480 VAC Diesel powered Generator	**X**			**X**	**X**	Minimum 350 kW	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.
Heavy Duty truck					**X**	Similar to F-750 with on-board fuel tanks for refueling portable equipment. Used to transport portable equipment and clear debris.	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Six (6) Industrial blower					**X**	42" 120V, 2 speed fan 13,300 CFM ON HIGH AND 9,500 CFM ON LOW	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.
Ten (10) Portable fans with flexible ducting					**X**	120V 5200 cfm	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Ten (10) light strings					**X**	50 feet long	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.
Ten (10) free standing Flood Lights with tripod base					**X**		Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Six (6) 120/240V Portable AC Generators					**X**	5.5 kW	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.
Three (3) Dewatering pumps – diesel driven					**X**		Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01, Section 6 and NEI 12-06, Section 11.

BWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Note: The RRC equipment has not been procured at the time of this submittal. Once the SAFER committee determines the equipment specifications for bid, updates will be made as necessary to this table. The Phase 3 portable equipment table will be updated once all of the equipment has been procured and placed in inventory.							
Medium Voltage Diesel Generator	**X**	**X**	**X**	**X**	**X**	2 MW output at 4160VAC, three phase	• Generator must be common commercially available. • Must run on diesel fuel.
Low Voltage Diesel Generator	**X**	**X**	**X**	**X**	**X**	500 kW output at 480VAC, three phase	• Generator must be common commercially available. • Must run on diesel fuel.
Low Pressure Pump	**X**	**X**	**X**			300 psi shutoff head, 2500 gpm max flow	
Low Pressure Pump	**X**		**X**			500 psi shutoff head, 500 gpm max flow	
Low Pressure Pump					**X**	110 psi shutoff head, 400 gpm max flow submersible	

BWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Low Pressure Pump	**X**	**X**				150 psi shutoff head, 5000 gpm max flow	
Air Compressor		**X**				120 psi minimum pressure, 2000 scfm	

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	The RRC will not stock this type of equipment but this equipment will be requested from site-to-site and utility-to-utility on an as required basis.
Commodities • Food • Potable water	The RRC will not stock these commodities but they will be requested from site-to-site and utility-to-utility on an as required basis.
Fuel Requirements	300 – 500 gallon bladders that can be delivered by air
Heavy Equipment • Transportation equipment • Debris clearing equipment	• TBD during site specific playbook development • Redundant Phase 2 equipment to be located at RRC

Attachment 1A
Sequence of Events Timeline

(insert site specific time line to support submittal)

Action item	Elapsed Time	Action	Time Constraint Y/N [5]	Remarks / Applicability
	0	**Event Starts**	NA	Plant @100% power
	0	Reactor scram	NA	Loss of power to Reactor Protection System results in a reactor scram.
1	1 min	Personnel enter DGP 02-03 and DGA 12	N	These actions will provide direction for reactor control and options for loss of AC power.
2	1 min	Isolation Condenser initiated for pressure control (or verified operating if auto initiation occurs)	N	DEOP 100 will direct action based on reactor pressure.
3	2 mins	Attempt to start EDGs upon identification of failure to auto start.	N	Per FLEX event initial conditions the EDGs are not available.
4	3 mins	Attempt to Start IC Makeup Pump for IC Shell side makeup	N	There are no fully qualified makeup sources for shell-side makeup.
5	5 mins	Personnel dispatched to investigate EDG failure to start.	N	Per FLEX event initial conditions the EDGs are not available.
6	5 mins	HPCI initiated for inventory control and reactor pressure control (or verified operating if auto initiation occurs).	N	HPCI suction will auto swap to the Torus due to CSTs being assumed lost with the FLEX event (not missile protected).
7	10 mins	Attempt to start SBO DG for either Unit	N	Per FLEX event initial conditions the EDGs are not available.
8	15 mins	Personnel dispatched to investigate SBO DG failure to start.	N	Per FLEX event initial conditions the EDGs are not available.

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

Attachment 1A
Sequence of Events Timeline

(insert site specific time line to support submittal)

Action item	Elapsed Time	Action	Time Constraint Y/N [5]	Remarks / Applicability
9	15 mins	Perform 125 VDC load shedding per DGA 13	N	This is an immediate action of DGA 13 to prolong battery availability. Must be completed by 30 minutes after event initiation.
10	20 mins	Isolation Condenser secured due to lack of shell-side makeup.	Y	Per UFSAR, the IC will operate for approximately 20 minutes without shell-side makeup. It is secured to prevent possible damage.
11	30 mins	125 and 250 VDC Load Shed Completed (actions identified in DGA 03, DGA 12 and DGA 13)	Y	DGA 12 Step D.13 identifies that load shedding to maintain battery availability must be completed if DC chargers are unavailable.
12	1 hr	Control Room crew has assessed SBO and plant conditions and declares an Extended Loss of AC Power (ELAP) event. • Personnel dispatched to implement FLEX strategy for supplying makeup water to the Isolation Condenser shell-side. • Personnel dispatched to implement FLEX strategy for supplying temporary power to battery chargers.	N	Time is reasonable approximation based on operating crew assessment of plant conditions
13	2 hrs	Complete actions for Loss of AEER Ventilation	N	Perform DOA 5750-1 Attachment C Step 6. Actions can be coordinated with personnel obtaining and staging portable generators, fans, etc.

Attachment 1A
Sequence of Events Timeline

(insert site specific time line to support submittal)

Action item	Elapsed Time	Action	Time Constraint Y/N [5]	Remarks / Applicability
14	2 hours	Establish natural air flow to HPCI room by opening doors.	Y	Preliminary GOTHIC analysis indicates opening doors at 2 hours will result in acceptable room temperature values to support operation of HPCI for at least 6 hours. HPCI room temperature remains below the isolation point during this time.
15	2 hours	Complete actions for loss of Main Control Room Ventilation.	N	DOA 5750-01 actions. Further analysis is required to determine time to reach 95°F.
16	2 hours	Defeat HPCI high temperature and flow isolations	N	Ensure HPCI remains available during the event.
17	4 hours	FLEX pump connected and ready for use to support Isolation Condenser shell-side makeup.	N	Based on previous demonstration to dispatch operators and set up the B.5.b pump for SFP spray, it is reasonable to expect the FLEX pump can be installed within this time period.
18	6 hours	Isolation Condenser initiated for RPV pressure control	Y	Complete prior to loss of 250 VDC batteries to ensure RPV heat removal mechanism operating prior to MAAP analysis assumed HPCI loss.
19	6 hours	HPCI secured due to DC battery depletion (125V and 250V)	N	Once the battery chargers are re-powered with portable generators HPCI remains available as an injection source.

Attachment 1A
Sequence of Events Timeline

(insert site specific time line to support submittal)

Action item	Elapsed Time	Action	Time Constraint Y/N [5]	Remarks / Applicability
20	6 hours	FLEX strategy for supplying temporary power to battery chargers complete and ready for use.	N	Preliminary review indicates the batteries will remain available for at least 6 hours without chargers.
21	10 hours	Personnel dispatched to establish temporary ventilation to the MCR and AEER (portable fans and associated generators).	N	Further analysis is required to determine if supplemental ventilation is needed.
22	12 hours	Makeup to the Spent Fuel Pools using FLEX pump strategy is available.	Y	EC 371913, Revision 2,: Time-to-Boil Curves., identifies a time to boil of 9.54 hours, and 110.07 hours to the top of active fuel. Therefore, completing the equipment line-up for initiating SFP makeup at 12 hours into the event ensures adequate cooling of the spent fuel is maintained.
23	24 hrs	Initial equipment from Regional Response Center becomes available.	N	NEI 12-06 assumption.
24	24-48 hours	Makeup to the RPV using FLEX pump strategy is available.	N	MAAP analysis indicates makeup is not required for at least 72 hours.
25	24-72 hrs	Continue to maintain critical functions of core cooling (via IC and FLEX Pump injection), containment (via hardened vent opening) and SFP cooling (FLEX pump injection to SFP). Utilize initial RRC equipment in spare capacity.	N	None

Attachment 2
Milestone Schedule

Site: Dresden

Original Target Completion Date		Activity	Status {Include date changes in this column}
		Submit 60 Day Status Report	Complete
		Submit Overall Integrated Implementation Plan	Complete
		Contract with RRC	Complete
Recurring action, Aug and Feb		Submit six (6) month updates	Ongoing
Unit 2	Unit 3	Modification Development	
Oct 2014	Sept 2015	• Phase 1 modifications	Note 1
Oct 2014	Sept 2015	• Phase 2 modifications	Note 1
Oct 2014	Sept 2015	• Phase 3 modifications	Note 1
Unit 2	Unit 3	Modification Implementation	
Nov 2015	Nov 2016	• Phase 1 modifications	Note 1
Nov 2015	Nov 2016	• Phase 2 modifications	Note 1
Nov 2015	Nov 2016	• Phase 3 modifications	Note 1
		Procedure development	
Nov 2015		• Strategy procedures	Note 1
Nov 2015		• Maintenance procedures	Note 1
Jul 2015		Staffing analysis	Note 1
Nov 2015		Storage Plan and construction	Note 1
Nov 2015		FLEX equipment acquisition	Note 1
Nov 2015		Training completion	Note 1
Jul 2015		Regional Response Center Operational	(will be a standard date from RRC)
Nov 2015		Unit 2 Implementation date	Note 1
Nov 2016		Unit 3 Implementation date	Note 1

Note(s):

1. Exelon will update the status of ongoing and future milestones in the Integrated Plan for DNPS during a scheduled six (6) month update. This update will include any changes to the milestone schedule as submitted in the February 28, 2013 Integrated Plan.

Attachment 3
Conceptual Sketches

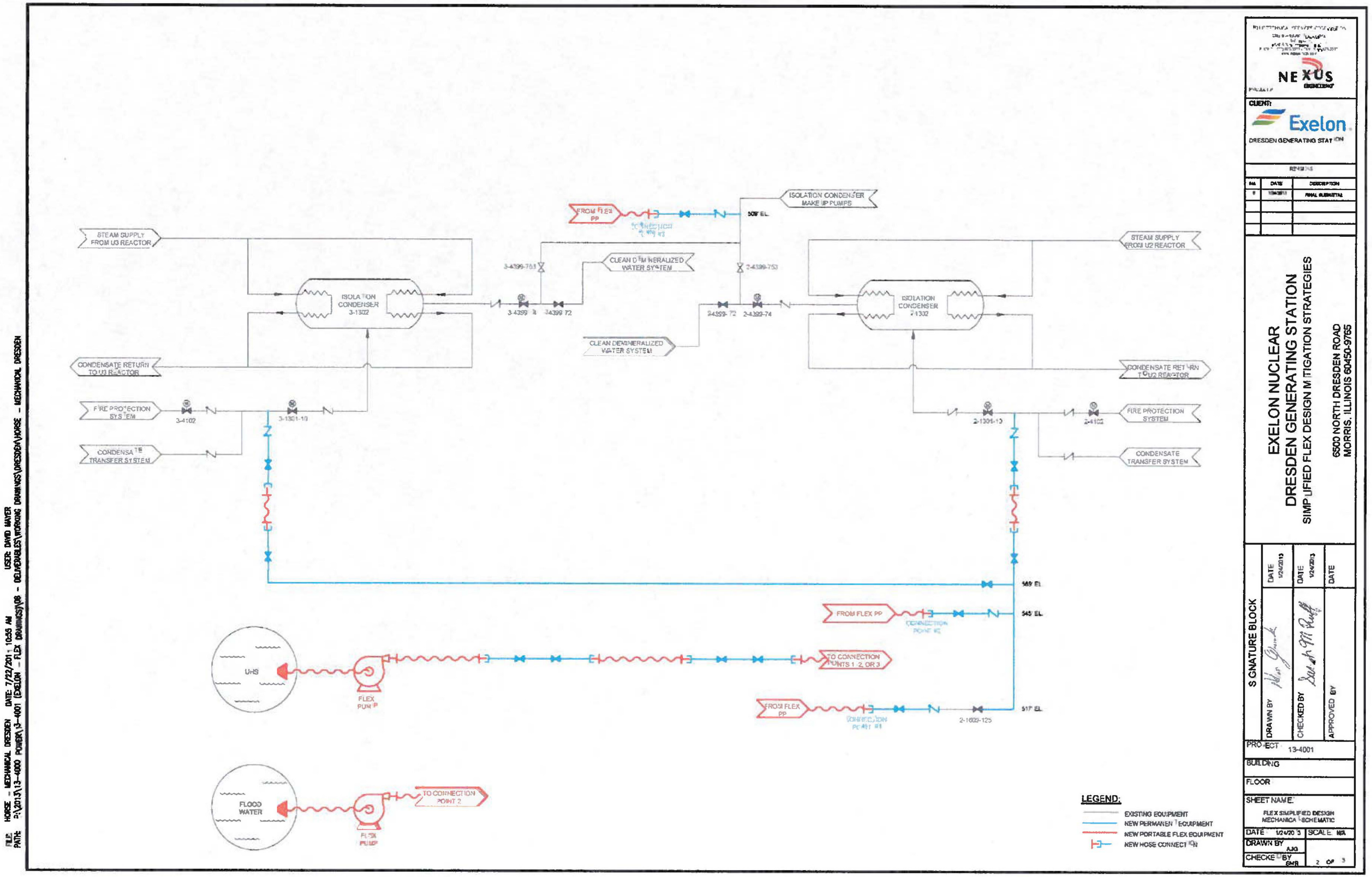

Figure 1 - Isolation Condenser Shell-side Makeup

Attachment 3
Conceptual Sketches

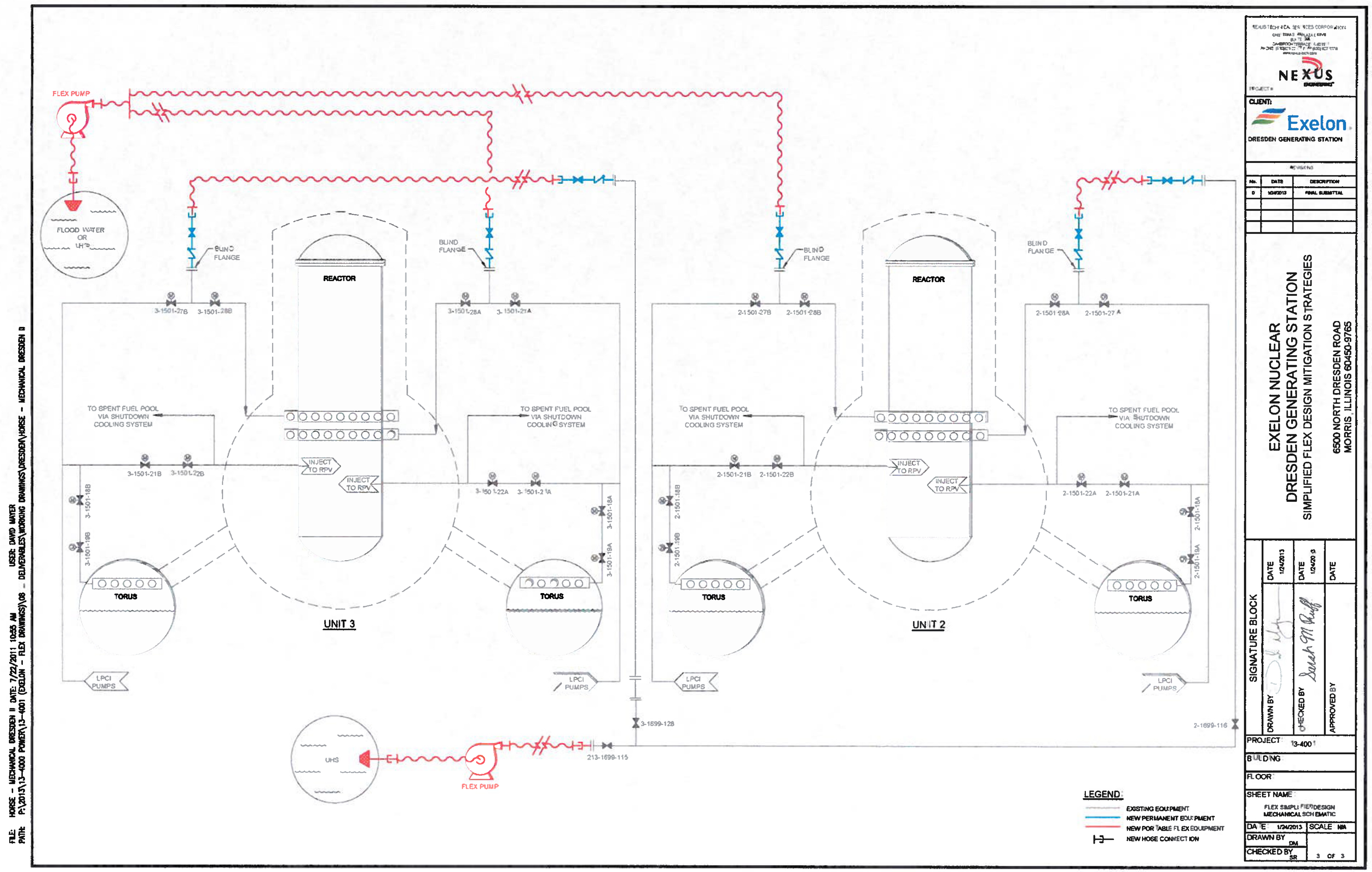

Figure 2 - RPV Makeup

Attachment 3
Conceptual Sketches

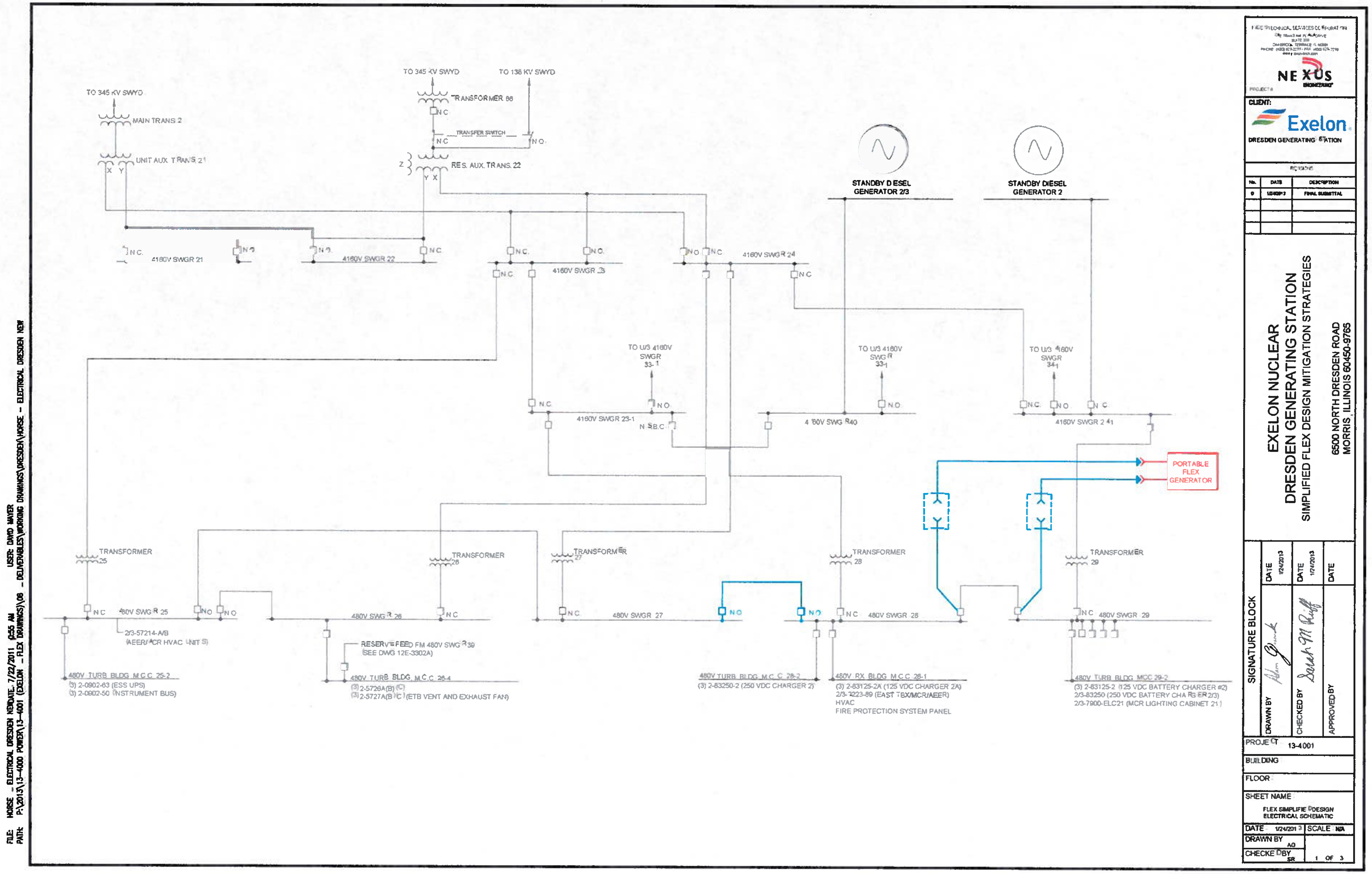

Figure 3 - Connection of external power source to 480 VAC Distribution

Attachment 3
Conceptual Sketches

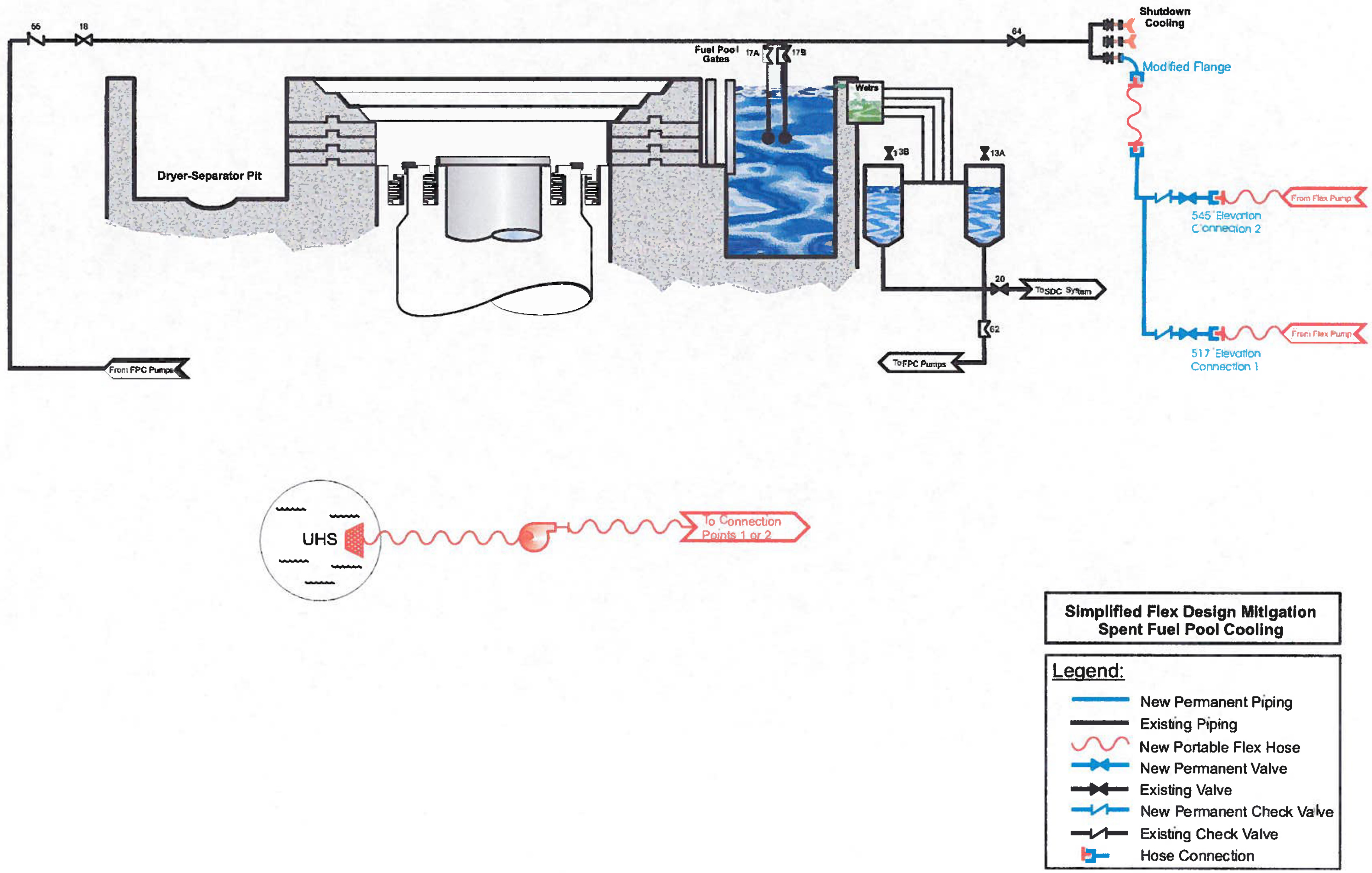

Figure 4 - Spent Fuel Pool Makeup