Exelon Generation®

Order No. EA-12-049

RS-13-119

August 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: First Six-Month 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)

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
5. Exelon Generation Company, LLC 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), dated February 28, 2013 (RS-13-020)

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 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the EGC initial status report regarding mitigation strategies. Reference 5 provided the Dresden Nuclear Power Station, Units 2 and 3 overall integrated plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. The purpose of this letter is to provide the first six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosed report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

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 August 2013.

Respectfully submitted,

Glen T. Kaegi
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

1. Dresden Nuclear Power Station, Units 2 and 3 First Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

cc: Director, Office of Nuclear Reactor Regulation
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Enclosure

Dresden Nuclear Power Station, Units 2 and 3

First Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

(16 pages)

Enclosure

Dresden Nuclear Power Station, Units 2 and 3 First Six Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

1 Introduction

Dresden Nuclear Power Station, Units 2 and 3 (Dresden) developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This enclosure provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

None

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

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
	Submit 6 month updates	
August 2013	Update 1	Complete with this submittal
February 2014	Update 2	Not Started
August 2014	Update 3	Not Started
February 2015	Update 4	Not started
August 2015	Update 5	Not Started

Original Target Completion Date		Activity	Status {Include date changes in this column}
February 2016		Update 6	Not Started
August 2016		Update 7	Not Started
		Submit Completion Report	
Unit 2	Unit 3	Modification Development	
Oct 2014	Sept 2015	• Phase 1 modifications	Started
Oct 2014	Sept 2015	• Phase 2 modifications	Started
Oct 2014	Sept 2015	• Phase 3 modifications	Not Started
Unit 2	Unit 3	Modification Implementation	
Nov 2015	Nov 2016	• Phase 1 modifications	Not Started
Nov 2015	Nov 2016	• Phase 2 modifications	Not started
Nov 2015	Nov 2016	• Phase 3 modifications	Not Started
		Procedure development	
Nov 2015		• Strategy procedures	Not Started
Nov 2015		• Validate Strategy Procedures (NEI 12-06, Sect. 11.4.3)	Not Started
Nov 2015		• Maintenance procedures	Not Started
Jul 2015		Staffing analysis	Not Started
Nov 2015		Storage Plan and construction	Started
Nov 2015		FLEX equipment acquisition	Started
Nov 2015		Training completion	Not Started
Jul 2015		Regional Response Center Operational	Started
Nov 2015		Unit 2 Implementation date	Not Started
Nov 2016		Unit 3 Implementation date	Not Started

4 Changes to Compliance Method

A BWROG review of Reactor Core Isolation Cooling (RCIC) operation with elevated suction temperatures was documented in a GE Task Report (GE Task Report 0000-0143-0382-R0, RCIC System

Operation in Prolonged Station Blackout – Feasibility Study, January 2012). The review indicated RCIC could continue to operate up to approximately 230ºF suction temperature. While RCIC and HPCI are similar it could not be determined if the results of the RCIC Study could be applied to HPCI. Therefore, it is now assumed HPCI will fail when Suppression Pool temperature reaches 140ºF. Utilization of this assumption and the MAAP results indicates approximately 2.5 hours of continuous HPCI operation is available in Phase 1. As a result of the revised assumption, the strategies for FLEX implementation were changed. The changes were large enough that the Original Integrated Plan was modified to describe the changes and the associated impacts. See Attachment 1 for a revised Sequence of Event Timeline. The entire revised FLEX Integrated Plan for Dresden Station (February 2013 FLEX Integrated Plan (REVISED August 28, 2013)) is attached to this enclosure.

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

Dresden Nuclear Power Station expects to comply with the order implementation date and no relief/relaxation is required at this time.

6 Open Items from Overall Integrated Plan and Draft Safety Evaluation

The following tables provide a summary of the open items documented in the Overall Integrated Plan or the Draft Safety Evaluation (SE) and the status of each item.

Section Reference	Overall Integrated Plan Open Item	Status
Sequence of Events (page 5-6)	The times to complete actions in the Events Timeline are based on operating judgment, conceptual designs, and current supporting analyses. The final timeline will be time validated once detailed designs are completed and procedures developed.	Not Started

Section Reference	Overall Integrated Plan Open Item	Status
Sequence of Events (page 5)	Analysis of deviations between Exelon's engineering analyses and the analyses contained in BWROG Document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines and documentation of results on Att. 1B, "NSSS Significant Reference Analysis Deviation Table." Planned to be completed and submitted with August 2013 Six Month Update.	Completed. Attachment 2 of this Six Month Status Update (Aug 2013)
Sequence of Events (page 8)	Initial evaluations were used to determine the fuel pool timelines. Formal calculations will be performed to validate this information during development of the spent fuel pool cooling strategy detailed design.	Not Started
Deployment Strategy (pages 8-9)	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. Identification of storage areas and creation of the administrative program are open items.	Started
Programmatic Controls (pages 9-10)	An administrative program for FLEX to establish responsibilities, and testing & maintenance requirements will be implemented.	Not Started
Spent Fuel Pool Cooling Phase 2 Discussion (page 46)	Complete an evaluation of the spent fuel pool area for steam and condensation.	Not Started
Safety Functions Support Phase 2 Discussion (page 57)	Evaluate the habitability conditions for the Main Control Room and develop a strategy to maintain habitability.	Not Started

Section Reference	Overall Integrated Plan Open Item	Status
Safety Functions Support Phase 2 Discussion (page 57)	Evaluate the habitability conditions for the Auxiliary Electric Equipment Room (AEER) and develop a strategy to maintain habitability.	Not Started

Draft Safety Evaluation Open Item	Status
N/A	N/A

7 Potential Draft Safety Evaluation Impacts

There are no potential impacts to the Draft Safety Evaluation identified at this time.

8 References

The following references support the updates to the Overall Integrated Plan described in this enclosure.

1. Dresden Nuclear Power Station's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 28, 2013 (subsequently revised Aug 28, 2013 – included as Attachment 3 to this enclosure).
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.
3. BWROG report NEDC-33771P, Rev. 1, "GEH Evaluation of FLEX Implementation Guidelines Rev. 1"

9 Attachments

1. Attachment 1, Revised Sequence of Events Timeline.
2. Attachment 2, NSSS Significant Reference Analysis Deviation Table (Attachment 1B of Overall Integrated Plan)
3. Attachment 3, Dresden Nuclear Power Station, Units 2 and 3 Mitigation Strategies Integrated Plan (REVISED August 28, 2013).

Attachment 1
Revised Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [1]	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 SBO DGs are not available.

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

Attachment 1
Revised Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [1]	Remarks / Applicability
8	15 mins	Personnel dispatched to investigate SBO DG failure to start.	N	Per FLEX event initial conditions the SBO DGs are not available.
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 hour	Control Room crew has assessed SBO and plant conditions and declares an Extended Loss of AC Power (ELAP) event. • Personnel dispatched to FLEX strategy for supplying make-up water to the Isolation Condenser shell-side. • Personnel dispatched to FLEX strategy for supplying power to the FLEX Makeup Pump and station battery chargers	N	Time is reasonable approximation based on operating crew assessment of plant conditions

Attachment 1
Revised Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [1]	Remarks / Applicability
13	2 hours	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.
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. HPCI operation is assumed for approximately 2.5 hours in Phase 1.
15	2 hours	Complete actions for loss of Main Control Room Ventilation.	N	DOA 5750-01 actions.
16	2 hours	Defeat HPCI high temperature and flow isolations	N	Ensure HPCI remains available during the event.
17	2.5 hours	FLEX strategy for supplying power to 480 VAC busses and associated Motor Control Centers (MCCs) completed.	Y	When the busses are energized, power will be available to the FLEX Makeup Pump. This will also supply power to battery chargers. Preliminary review indicates the batteries will remain available for at least 6 hours without chargers.

Attachment 1
Revised Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [1]	Remarks / Applicability
18	2.5 hours	FLEX pump connected and ready for use to support Isolation Condenser shell-side makeup.	Y	Due to pre-staging of major components, it is reasonable to expect the FLEX pump can be available within this time period.
19	2.5 hours	Isolation Condenser initiated for RPV pressure control	Y	Complete prior to loss of HPCI to ensure RPV heat removal mechanism operating prior to MAAP analysis assumed HPCI loss.
20	2.5 hours	HPCI assumed to fail due to suppression pool temperature of ≥140°F	N	HPCI may continue to operate above 140°F but it is not relied upon past this point and restoration of the Isolation Condenser will replace the need for HPCI in terms of RPV pressure control.
21	3 hours	Isolate both Reactor Recirculation Loops by closing suction and discharge valves	N	Recirc loops are isolated to reduce RPV leakage. The sooner this is accomplished the more reactor inventory is conserved.
22	4 hours	Run hoses from CCSW FLEX Standpipe on 545' elevation to the SBLC Tank.	N	Establishing a makeup source to the tank provides continued availability of a high pressure RPV makeup source.

Attachment 1
Revised Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [1]	Remarks / Applicability
23	4 hours	Initiate SBLC as necessary for RPV level control.	N	Per MAAP analysis after Recirc Loops are isolated and the Isolation Condenser is controlling reactor pressure, RPV leakage will be reduced to approximately 15 gpm at time = 3.0 hours. Makeup from SBLC can be utilized to maintain RPV level above Top of Active Fuel (TAF).
24	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.
25	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 make-up at 12 hours into the event ensures adequate cooling of the spent fuel is maintained.
26	24 hours	Initial equipment from Regional Response Center becomes available.	N	NEI 12-06 assumption.
27	24 hours	Makeup to the RPV using FLEX Makeup pump strategy is available.	N	SBLC is available as a high pressure injection source. Low pressure makeup from FLEX Makeup Pump will not be required before this time.

Attachment 1
Revised Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [1]	Remarks / Applicability
28	24-72 hours	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

NSSS Significant Reference Analysis Deviation Table (Attachment 1B of Overall Integrated Plan)

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771 P Page	Plant Applied Value	Design Value	Gap and Discussion
NEDC-33771P Rev 1 Section 4.5.1.1 (BWR/2/3. Mark I and EC System Assumptions) and Table 4.5.2-1 Appendix A are closest to the Dresden Nuclear Power Station and associated response. Differences between the GEH SHEX case and the MAAP analysis of the Dresden strategy are listed below.						
Input Parameter Values						
1	Core thermal power	Proprietary information. Refer to report for value.	15	2957 MWT	NA	The GEH model BWR 2/3 Mark I reference plant has lower core thermal power rating.
2	Primary System Leakage	Proprietary information. Refer to report for value.	15	61 gpm	NA	The reference plant has 5 Recirculation Loops which results in a higher value for Recirc Pump seal leakage. Dresden has 2 Recirculation Loops per reactor.
3	Emergency Condenser capacity	Proprietary information. Refer to report for value.	15	$2.52E+10^{8}$ Btu/hr	$2.52E+10^{8}$ Btu/hr	The reference plant has 2 Emergency Condensers whereas Dresden has 1 Isolation Condenser.
4	Wetwell Free Volume	Proprietary information. Refer to report for value.	16	110,618 ft^3	NA	The differences in reference plant structural design and minor differences in assumed parameter values at time zero should have a negligible effect on the

Attachment 2

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771P Page	Plant Applied Value	Design Value	Gap and Discussion
5	Wetwell airspace temperature	Proprietary information. Refer to report for value.	16	95°F	NA	progression of the event after a few hours.
6	Initial Wetwell Pressure	Proprietary information. Refer to report for value.	16	14.7 psia	NA	
7	Intial Wetwell humidity	Proprietary information. Refer to report for value.	16	100%	NA	
8	Suppression Pool Volume	Proprietary information. Refer to report for value.	16	118,630 ft^3	NA	
9	Suppression Pool initial temperature	Proprietary information. Refer to report for value.	16	95°F	NA	
10	Drywell Free Volume	Proprietary information. Refer to report for value.	16	158,236 ft^3	NA	

Attachment 2

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771P Page	Plant Applied Value	Design Value	Gap and Discussion
11	Initial Drywell Temperature	Proprietary information. Refer to report for value.	16	150°F	NA	
12	Initial Drywell Pressure	Proprietary information. Refer to report for value.	16	15.7 psia	NA	
13	Initial Drywell Humidity	Proprietary information. Refer to report for value.	16	50%	NA	
Resultant Parameter Values						
	Maximum Drywell Pressure	Proprietary information. Refer to report for value.	40	30.3 psia at t_0 + 24 hrs	62 psig	
	Maximum Drywell Temperature	Proprietary information. Refer to report for value.	40	260°F at t_0 + 24 hrs	281°F	

Attachment 2

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771P Page	Plant Applied Value	Design Value	Gap and Discussion
	Maximum Wetwell Pressure	Proprietary information. Refer to report for value.	40	28.5 psia at t_0 + 24 hrs	62 psig	
	Maximum Wetwell Airspace Temperature	Proprietary information. Refer to report for value.	40	146°F at t_0 + 24 hrs	281°F	
	Maximum Suppression Pool Temperature	Proprietary information. Refer to report for value.	40	140°F at t_0 + 24 hrs	N/A	

Attachment 3
Dresden Nuclear Power Station, Units 2 and 3 Mitigation Strategies Integrated Plan
(REVISED August 28, 2013)
(89 pages)

General Integrated Plan Elements BWR	
Site: Dresden	
Determine Applicable Extreme External Hazard **Ref: NEI 12-06 section 4.0 -9.0** **JLD-ISG-2012-01 section 1.0**	*Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps.* *Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant screened out for certain hazards.* 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: Seismic Hazard Assessment: 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. External Flood Hazard Assessment: The Probable Maximum Flood (PMF), described in the 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. Extreme Cold Hazard Assessment: 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 35th parallel. DNPS is located above of the 35th 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. High Wind Hazard Assessment: 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. Extreme High Temperature Hazard Assessment: 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. References 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 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).* *Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B)* General Technical Basis information • BWROG document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines" has been compared to the Dresden proposed strategies and Modular Accident Analysis Program (MAAP) results. Attachment 1B discusses the differences between the reference BWR 2/3 with Emergency Condenser and Dresden. The results of the BWROG document and Dresden response are consistent. In each case at the end of 24 hours the peak containment values are below their respective design limits with significant margins to the limits. Therefore, containment venting to remove heat from the containment is not required. • 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. Securing of the Isolation Condenser would be based on shell-side water level. Depending on initiating conditions and shell-side boil-off the time could be longer than 20 minutes. 20 minutes is utilized in the MAAP assumptions for conservatism. 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 155ºF after 6 hours which is below the lowest Group 4 Isolation Point of 162ºF specified in DIS 2300-07 (Reference 2) ITEM#17 MAAP analysis (Reference 1, DR_FLEX_CASE9) indicates that initiation of the IC at approximately the 2.5 hour point will result in RPV water level being maintained above top of active fuel (TAF) for greater than 16 hours. FLEX strategy for supplying power to 480 VAC busses and associated Motor Control Centers (MCCs) must be

	completed to power the FLEX Makeup Pumps for IC Shell-side makeup. Due to pre-staging of major components, it is reasonable to expect the FLEX Makeup pump can be energized within this time period. ITEM#18 MAAP analysis (Reference 1, DR_FLEX_CASE9) indicates that initiation of the IC at approximately the 2.5 hour point will result in RPV water level being maintained above top of active fuel (TAF) for greater than 16 hours. Due to pre-staging of major components, it is reasonable to expect the FLEX Makeup pump can be FLEX pump connected and ready for use to support Isolation Condenser shell-side makeup within this time period. ITEM#19 MAAP analysis (Reference 1, DR_FLEX_CASE9) indicates that initiation of the IC at approximately the 2.5 hour point will result in RPV water level being maintained above top of active fuel (TAF) for greater than 16 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 230ºF suction temperature. While RCIC and HPCI are similar it could not be determined if the results of the RCIC Study could be applied to HPCI. Therefore, it is assumed HPCI will fail when Suppression Pool temperature reaches 140ºF. Utilization of this assumption and the MAAP results indicates approximately 2.4 hours of HPCI operation is available in Phase 1. ITEM #25 Spent Fuel Pool (SFP) make-up is not a time constraint with the initial condition of Mode 1 @ 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 make-up 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 make-up 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. <u>References</u> 1. DR-MISC-043 Revision 1, 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**
  o **Phase 1 Modifications**
  o **Phase 2 Modifications**
  o **Phase 3 Modifications**
• **Procedure guidance development complete**
  o **Strategies**
  o **Maintenance**
• **Storage plan (reasonable protection)**
• **Staffing analysis 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 Assemble 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 (as revised Aug 28, 2013).

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.

<u>Power Operation, Startup, and Hot Shutdown</u>

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).

With continuous HPCI operation MAAP analysis (Reference 1) indicates suppression pool temperature reaches 140ºF approximately 2.5 hours after event initiation. 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 based on lube oil heat exchanger performance and pump net positive suction head. Utilization of this assumption and the MAAP results indicates 2.5 hours of HPCI operation is available in Phase 1.

With regards to DC power, HPCI would remain a viable source as long as 250VDC power is available. 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. 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. Therefore, 250VDC availability is not limiting to HPCI operation in Phase 1 when compared to pump suction temperatures from the Suppression Pool.

Pressure Control

As described in the Dresden UFSAR (Reference 2, Section 5.4.6.), the Isolation Condenser (IC)

[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.

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 will be secured based on shell-side water level 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 (SRV) and/or Electromatic Relief Valves (ERV) will operate to control RPV pressure. The Target Rock Safety Relief Valve and ERVs release 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 MAAP analysis indicates suppression pool temperature reaches 140ºF approximately 2.5 hours after event initiation. MAAP case DR_FLEX_CASE8 (Reference 1) most closely resembles the expected Phase 1 system response. Following the loss of HPCI as an injection source due to suppression pool temperature exceeding 140 ºF 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 4.5 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 assumed leakage sources. Primary Containment pressure reaches design pressure approximately 8-9 hours after the event.

Based on the above information, the coping time for Dresden Station using installed equipment is approximately 4.5 hours when core uncovery occurs.

Additionally MAAP analysis (Reference 1, DR_FLEX_CASE8) identified the Heat Capacity Temperature Limit (HCTL) is reached approximately 4 hours into the event and the Pressure Suppression Pressure is reached approximately 6 hours into the event. Based on this information and current Dresden Emergency Operating Procedures (Reference 3) RPV emergency depressurization will not be required before HPCI is assumed to fail.. Once the IC is placed back in service at approximately 2.5 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 4 and 5) 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 implementation of a FLEX Makeup pump to supply injection flow must commence as soon as possible from the initiation 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 utilization of a FLEX Makeup 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 without interference from outage equipment during refueling outages.

References:

1. DR-MISC-043 Revision 1, MAAP Analysis to Support FLEX Initial Strategy.
2. Dresden Nuclear Power Station Updated Final Safety Analysis Report, Revision 9
3. DEOP 200-1, Primary Containment Control, Revision 10
4. OU-AA-103, Shutdown Safety Management Program
5. EC 371913, Revision 2,: Time-to-Boil Curves

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. 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 (as revised Aug 28, 2013).

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 1 (Reference 1). Case DR_FLEX_CASE9 best represents the postulated conditions where the assumed RPV leakage is 61 gpm with no RPV makeup after HPCI operation ceases.

Station personnel will line-up pre-staged 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 16 hours without makeup. The only inventory losses during this time will be the assumed 61 gpm leakage.

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

RPV Pressure Control

Dresden will utilize pre-staged 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 SRV/ERV operation and the subsequent RPV inventory loss/Suppression Pool heat addition.

Shell-side makeup to the IC will be established using a proposed pre-staged AC powered FLEX Makeup Pump. The pump suction will be from the Ultimate Heat Sink (UHS) utilizing existing Containment Closed Service Water (CCSW) suction piping. Pump discharge will be directed through a temporary connection to existing Containment Closed Service Water (CCSW) pump discharge piping and then into the Reactor Building. New standpipes will be installed on the CCSW piping to establish valve stations in the Reactor Building. Hoses will be routed from the standpipe valve stations to the following locations, either of which will supply shell-side makeup water to both Isolation Condensers. Therefore, only 1 FLEX Makeup Pump is required to meet the strategy needs for both Units.

1. Primary Strategy
   The first proposed strategy is associated with the currently installed IC Makeup Pump discharge line. New taps will be installed on the 8" combined discharge piping of the IC Makeup Pumps in the Reactor Building. The taps will include a check valve, gate valve, and quick hose connection to connect to pipe line 2/3-43218-8". Taps will be located on 517' elevation (preferred) and 545' (available during flood conditions) elevations. The primary source will be the Unit 2 FLEX Makeup Pump.

Maintain Core Cooling

BWR Portable Equipment Phase 2:

2. Alternate Strategy
   The alternate strategy will be to use the Unit 3 FLEX Makeup Pump and associated CCSW standpipe to supply shell-side makeup water to both Isolation Condensers.

Connection of a FLEX Makeup pump via a hose to one of the proposed hose connections on the combined IC Makeup Pump discharge piping (on the 517' elevation, or on the 545' elevation in the Reactor Building) allows water from the UHS to be supplied directly to the IC shells with minimal impact on the staffing requirements at Dresden.

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. The proposed FLEX Makeup Pumps will be capable of operating under water and therefore will be available during a flooding event. Additionally, these modifications are designed to supply both the Unit 2 IC and the Unit 3 IC simultaneously. The Pump motors will be powered from 480 VAC Motor Control Centers (MCCs) that are capable of being powered by the FLEX Diesel Generators described in the Safety Function Support – Phase 2 section of this submittal.

RPV Makeup

The Phase 1 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, 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 proposed pre-staged AC powered FLEX Makeup Pumps. The pump suction will be from the Ultimate Heat Sink (UHS) utilizing existing Containment Closed Service Water (CCSW) suction piping. Pump discharge will be directed through a temporary connection to existing Containment Closed Service Water (CCSW) pump discharge piping and then into the Reactor Building. New standpipes will be installed on the CCSW piping to establish valve stations in the Reactor Building. Due to the proposed location of the standpipes and the capacity of the proposed pumps, 1 FLEX Makeup Pump is capable of supplying makeup to both Units. Hoses will be routed from the standpipe valve stations to one of two proposed locations.

1. Primary Strategy

   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 hose would

Maintain Core Cooling

BWR Portable Equipment Phase 2:

then be utilized to connect at this location from the CCSW Standpipe on the 517' elevation. Water would flow from the FLEX pump discharge, into the CCSW Standpipe manifold 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 hose would then be utilized to connect at this location from the CCSW Standpipe on the 517' elevation. Water would flow from the FLEX pump discharge, into the CCSW Standpipe manifold 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.

2. Alternate Strategy
The second proposed strategy is associated with a similar flow path for the upper drywell spray headers on the 545' elevation 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 utilized to connect at this location from the CCSW Standpipe on the 545' elevation. Water would flow from the FLEX pump discharge, into the CCSW Standpipe manifold valve, through the hose between the new connections 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 utilized to connect at this location from the CCSW Standpipe on the 545' elevation. Water would flow from the FLEX pump discharge, into the CCSW Standpipe manifold valve, through the hose between the new connections 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.

These modifications are in diverse locations, and the connection points and piping will be qualified for the five Beyond Design Basis External Events (BDBEEs) that must be considered for implementation of FLEX. The proposed FLEX Makeup Pumps will be capable of operating under water and therefore will be available during a flooding event. Additionally, these modifications are designed to supply both the Unit 2 and the Unit 3 RPV Makeup needs

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
simultaneously from one FLEX Makeup Pump. The Pump motors will be powered from 480 VAC Motor Control Centers (MCCs) that are capable of being powered by the FLEX Diesel Generators described in the Safety Function Support – Phase 2 section of this submittal. Two additional actions will be available to limit RPV inventory reduction when a FLEX Diesel Generator is started and 480 V Busses/MCCs are energized. • The first action will involve isolation of the Reactor Recirculation Loops. The loop isolation valves are AC powered and can be closed when power is available. This will eliminate the Recirculation Pump Seal Leakage (36 gpm total of the assumed RPV leakage). DR-MISC-043 Revision 1 (Reference 1) Case DR_FLEX_CASE11 is similar to Case DR_FLEX_CASE9 but it simulates the plant response of isolating the Recirculation Loops at 3.0 hours. The time to core uncovery increases from 16.8 hours to 37.3 hours. It is important to note these times in DR-MISC-043 Revision 1 (Reference 1) Case DR_FLEX_CASE11are based on conditions with no RPV makeup source. If RPV makeup is available core uncovery does not occur. • The second action is the availability of energizing Standby Liquid Control (SBLC) pumps in non-flood initiating events. Each pump can supply 40 gpm at a discharge pressure of up to 1250 psig. The SBLC Storage Tank would then be used as an RPV makeup source. Utilization of SBLC as a high pressure injection source will further lengthen the time to core uncovery in DR-MISC-043 Revision 1 (Reference 1) Case DR_FLEX_CASE11. High pressure injection will not be required in a flood scenario because the plant is shutdown and depressurized prior to the flood reaching the 517' elevation. Under flood conditions, the FLEX Makeup Pump will be the RPV injection source. It is expected that continued use of the Isolation Condenser for RPV heat removal/pressure control, with a FLEX Makeup 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 1, 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.

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
Identify modifications	*List modifications* 1. Installation of new piping and associated connections, valve and flanges, and new connection points in the existing IC shell-side makeup line to allow for the connection of a pre-staged FLEX Makeup pump to provide a path from one Unit for IC shell-side makeup. (see Attachment 3 Figures 1 and 2) 2. Installation of new piping and associated connections, valve and flanges, to allow for the connection of a pre-staged FLEX Makeup pump to provide a path from the opposite Unit for IC shell-side makeup. This will provide another source of shell-side makeup. (see Attachment 3 Figures 1 and 2) 3. Installation of new connection points associated with the LPCI Lower Drywell Spray piping to provide RPV makeup using a pre-staged FLEX Makeup pump. (see Attachment 3 Figures 1 and 3) 4. Installation of new connection points associated with the LPCI Upper Drywell Spray piping to provide RPV makeup using a pre-staged FLEX Makeup pump. (see Attachment 3 Figures 1 and 3)
Key Reactor Parameters	*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

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	• **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 2-1340-2 — Instrument Bus (Available for all events except flooding above 517' elevation) 3-1340-2 — Instrument Bus (Available for all events except flooding above 517' elevation) 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

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to DNPS. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment will be located in areas above the flood level (such as FLEX Generator) or capable of operating submerged (FLEX Makeup Pump). During flood preparations the appropriate connections and equipment set-up will be completed such that actions to support core cooling will be completed before the flood level reaches 517’ elevation.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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.

Maintain Core Cooling		
BWR Portable Equipment Phase 2:		
	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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.	
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*
For the primary and alternate strategy (for IC shell-side makeup), FLEX pumps will be pre-staged on each unit in the area of the CCSW pumps. The FLEX Pumps will take suction from the UHS source available at the CCSW pumps and will be connected to the discharge of a CCSW pump on each unit. The CCSW discharge piping will be modified by the installation of a standpipe in the Reactor Building with valve manifolds which will provide connection points for hoses to the IC Makeup system.	Deployment to use the FLEX pumps for IC Makeup will consist of connecting the discharge piping as well as the electrical power supply for the 480 VAC motor (provided by FLEX portable generator through existing 480 VAC buses). Necessary modifications for deployment include: • Pre-stage 480 VAC FLEX pumps near the CCSW Pumps • Install suction and discharge piping for pre-staged FLEX pumps to allow timely connection • Install electrical supply to pre-staged FLEX pumps to allow timely connection	FLEX pump piping connections will be protected in the area of the existing CCSW pumps located in a lower elevation of the Turbine building. Electrical connections for the FLEX 480 VAC generator are conceptually planned to be located in a structure above the Unit 2 High Radiation Sampling System (HRSS) Building and in the Reactor Building. Both locations are robust against the designated FLEX initiating conditions.

Maintain Core Cooling		
BWR Portable Equipment Phase 2:		
		Preliminary review indicates all connections to support the Primary strategy will be inside the current Station power block and therefore inside robust structures. To provide response during flood conditions, appropriate components will be capable of operating submerged and connections above the flood level will be available. FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.
For the primary and alternate strategy (for RPV makeup), FLEX pumps will be pre-staged on each unit in the area of the CCSW pumps. The FLEX Pumps will take suction from the UHS source available at the CCSW pumps and will be connected to the discharge of a CCSW pump on each unit. The CCSW discharge piping will be modified by the installation of a standpipe in the Reactor Building with valve manifolds which will be connected via hoses to either DW Spray Line. Installed LPCI Piping will then be utilized to transport the water into the RPV.	Deployment to use the FLEX pumps for RPV Makeup will consist of connecting the discharge piping as well as the electrical power supply for the 480 VAC motor (provided by FLEX portable generator through existing 480 VAC buses). Necessary modifications for deployment include: • Pre-stage 480 VAC FLEX pumps near the CCSW Pumps • Install suction and discharge piping for pre-staged FLEX pumps to allow timely connection • Install electrical supply to	FLEX pump piping connections will be protected in the area of the existing CCSW pumps located in a lower elevation of the Turbine building. Electrical connections for the FLEX 480 VAC generator are conceptually planned to be located in a structure above the Unit 2 High Radiation Sampling System (HRSS) Building and in the Reactor Building. Both locations are robust against the

Maintain Core Cooling		
BWR Portable Equipment Phase 2:		
	pre-staged FLEX pumps to allow timely connection	designated FLEX initiating conditions. Preliminary review indicates all connections to support the Primary strategy will be inside the current Station power block and therefore inside robust structures. To provide response during flood conditions, appropriate components will be capable of operating submerged and connections above the flood level will be available. FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.

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 (as revised Aug 28, 2013).

Maintain Core 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 core cooling. Identify methods (RCIC/HPCI/IC) and strategy(ies) utilized to achieve this coping time. Phase 1 and 2 strategy will provide sufficient capability that no additional Phase 3 strategies are required. In the event additional equipment is needed portable pumps and generators can utilize the connection points installed in Phase 2 modifications to provide the necessary flow and pressure as outlined in Phase 2 response for RPV Pressure Control and RPV Makeup.	
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 Reactor Parameters	*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

Maintain Core Cooling	
BWR Portable Equipment Phase 3:	
	• **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 2-1340-2 — Instrument Bus (Available for all events except flooding above 517' elevation) 3-1340-2 — Instrument Bus (Available for all events except flooding above 517' elevation) 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

Maintain Core 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 (as revised Aug 28, 2013).

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 Suppression Pool temperature is less than or equal to 140°F and 250VDC power is available. 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 assumed RPV leakage into the Drywell), 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_CASE11) performed identified drywell pressure would be approximately 20 psig at 2.5 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. BWROG document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines" has been compared to the Dresden proposed strategies and Modular Accident Analysis Program (MAAP) results. The results of the BWROG document and Dresden response are consistent. In each case at the end of 24 hours the peak containment values are below their respective design limits with significant margins to the limits. Therefore, containment venting to remove heat from the containment is not required. Reliable Hardened Vent System (RHVS) will be available for use to vent containment if necessary. Procedures (References 3, 4 and 5) provide the required directions to accomplish this task. Monitoring of containment (drywell) pressure and temperature will be available via normal plant instrumentation.

[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.

<table>
<tr><td colspan="2">References:

1. DR-MISC-043 Revision 1, MAAP Analysis to Support FLEX Initial Strategy.
2. Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", NEI 12-06, Revision 0, August 2012
3. DEOP 0200-01, Primary Containment Control
4. DOA 1600-09, Emergency Containment Venting
5. DEOP 500-4, Containment Venting</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

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.</td></tr>
<tr><td>Identify modifications</td><td>List modifications

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

• Containment Pressure
<u>Instrument</u> — <u>Power supply</u>
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
<u>Instrument</u> — <u>Power supply</u>
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.</td></tr>
</table>

	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 (as revised Aug 28, 2013).

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 pre-staged 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. Shell-side makeup to the IC will be established using a proposed pre-staged AC powered FLEX Makeup Pump. The pump suction will be from the Ultimate Heat Sink (UHS) utilizing existing Containment Closed Service Water (CCSW) suction piping. Pump discharge will be directed through a temporary connection to existing Containment Closed Service Water (CCSW) pump discharge piping and then into the Reactor Building. New standpipes will be installed on the CCSW piping to establish valve stations in the Reactor Building. Hoses will be routed from the standpipe valve stations to the following locations, either of which will supply shell-side makeup water to both Isolation Condensers. Therefore, only 1 FLEX Makeup Pump is required to meet the strategy needs for both Units. 1. Primary Strategy The first proposed strategy is associated with the currently installed IC Makeup Pump discharge line. New taps will be installed on the 8" combined discharge piping of the IC Makeup Pumps in the Reactor Building. The taps will include a check valve, gate valve, and quick hose connection to connect to pipe line 2/3-43218-8". Taps will be located on 517' elevation (preferred) and 545' (available during flood conditions) elevations. The primary source will be the Unit 2 FLEX Makeup Pump. This strategy will supply shell-side makeup water to both Isolation Condensers. 2. Alternate Strategy The alternate strategy will be to use the Unit 3 FLEX Makeup Pump and associated CCSW standpipe to supply shell-side makeup water to both Isolation Condensers. Connection of a FLEX pump via a hose to one of the proposed quick hose connections on the combined IC Makeup Pump combined discharge piping (on the 517' elevation or the 545' elevation in the Reactor Building) allows water from the UHS to be supplied directly to the IC shells with minimal impact on the staffing requirements at Dresden. 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. The proposed FLEX Makeup Pumps will be capable of operating under water and therefore will be available during a flooding event. Additionally, these modifications are designed to supply both the Unit 2 IC and the Unit 3 IC simultaneously. The Pump motors will be powered from 480 VAC Motor Control Centers (MCCs) that are capable of being powered by the FLEX Diesel Generators described in the

<table>
<tr><td colspan="2">Maintain Containment</td></tr>
<tr><td colspan="2">BWR Portable Equipment Phase 2:</td></tr>
<tr><td colspan="2">Safety Function Support – Phase 2 section of this submittal.

MAAP analysis (Reference 1, DR_FLEX_CASE11) trends indicate that Drywell Pressure will stabilize below 40 psig and remain there if reactor water level remains above the top of active fuel and the IC remains available. Phase 2 of containment integrity is maintained throughout the duration of the event.

<u>References</u>
1. DR-MISC-043 Revision 1, MAAP Analysis to Support FLEX Initial Strategy.</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

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.</td></tr>
<tr><td>Identify modifications</td><td>List modifications

1. Installation of new piping and associated connections, valve and flanges, and new connection points in the existing IC shell-side makeup line to allow for the connection of a pre-staged FLEX Makeup pump to provide a path from one Unit for IC shell-side makeup. (see Attachment 3 Figures 1 and 2)

2. Installation of new piping and associated connections, valve and flanges, to allow for the connection of a pre-staged FLEX Makeup pump to provide a path from the opposite Unit for IC shell-side makeup. This will provide another source of shell-side makeup. (see Attachment 3 Figures 1 and 2)</td></tr>
<tr><td>Key Containment Parameters</td><td>List instrumentation credited or recovered for this coping evaluation.</td></tr>
</table>

Maintain Containment	
BWR Portable Equipment Phase 2:	
	• **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 instrument, no power required • **Suppression Pool Temperature** Instrument — Power supply TIRS2(3)-1640-200A(B) — Instrument Bus There are no instruments that meet the NEI 12-06 requirements for flood conditions. Temperature will be taken locally at the torus using surface pyrometer. • **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 2-1340-2 — Instrument Bus (Available for all events except flooding above 517' elevation) 3-1340-2 — Instrument Bus (Available for all events except flooding above 517' elevation) 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.

Maintain Containment	
BWR Portable Equipment Phase 2:	
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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

Maintain Containment	
BWR Portable Equipment Phase 2:	
	flood conditions. Pre-staged Phase 2 equipment will be located in areas above the flood level (such as FLEX Generator) or capable of operating submerged (FLEX Makeup Pump). During flood preparations the appropriate connections and equipment set-up will be completed such that actions to support core cooling will be completed before the flood level reaches 517' elevation.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be

Maintain Containment	
BWR Portable Equipment Phase 2:	
	located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.

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*
For the primary and alternate strategy (for IC shell-side makeup), FLEX pumps will be pre-staged on each unit in the area of the CCSW pumps. The FLEX Pumps will take suction from the UHS source available at the CCSW pumps and will be connected to the discharge	Deployment to use the FLEX pumps for IC Makeup will consist of connecting the discharge piping as well as the electrical power supply for the 480 VAC motor (provided by FLEX portable generator through existing 480 VAC buses). Necessary	FLEX pump piping connections will be protected in the area of the existing CCSW pumps located in a lower elevation of the Turbine building. Electrical connections for

Maintain Containment		
BWR Portable Equipment Phase 2:		
of a CCSW pump on each unit. The CCSW discharge piping will be modified by the installation of a standpipe in the Reactor Building with valve manifolds which will be connected to the IC Makeup system.	modifications for deployment include: • Pre-stage 480 VAC FLEX pumps near the CCSW Pumps • Install suction and discharge piping for pre-staged FLEX pumps to allow timely connection • Install electrical supply to pre-staged FLEX pumps to allow timely connection	the FLEX 480 VAC generator are conceptually planned to be located in a structure above the Unit 2 High Radiation Sampling System (HRSS) Building and in the Reactor Building. Both locations are robust against the designated FLEX initiating conditions. Preliminary review indicates all connections to support the Primary strategy will be inside the current Station power block and therefore inside robust structures. To provide response during flood conditions, appropriate components will be capable of operating submerged and connections above the flood level will be available. FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.
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		

Maintain Containment
BWR Portable Equipment Phase 2:
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 (as revised Aug 28, 2013).

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. Phase 1 and 2 strategy will provide sufficient capability that no additional Phase 3 strategies are required. In the event additional equipment is needed portable pumps and generators can utilize the connection points installed in Phase 2 modifications to provide the necessary flow and pressure as outlined in Phase 2 response.	
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*

Maintain Containment		
BWR Portable Equipment Phase 3:		
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 (as revised Aug 28, 2013).

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) make-up is not a time constraint with the initial condition of Mode 1 @ 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 make-up 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 make-up 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.02 "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 (as revised Aug 28, 2013).

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. Dresden Nuclear Power Station (DNPS) personnel will line-up a proposed pre-staged AC powered FLEX Makeup Pump to supply water to the spent fuel pool (SFP). The pump suction will be from the Ultimate Heat Sink (UHS) utilizing existing Containment Closed Service Water (CCSW) suction piping. Pump discharge will be directed through a temporary connection to existing Containment Closed Service Water (CCSW) pump discharge piping and then into the Reactor Building. New standpipes will be installed on the CCSW piping to establish valve stations in the Reactor Building. Hoses will be routed from the standpipe valve stations to a proposed modification on the SFP cooling discharge header. Due to the proposed location of the standpipes and the capacity of the proposed pumps, 1 FLEX Makeup Pump is capable of supplying makeup to both Units' Spent Fuel Pools. The modification of the SFP cooling discharge header will consist of connecting into the Shutdown Cooling (SDC) piping 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 a manual valve at the standpipe 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 50.54 (hh)(2) requirements. Given the initial conditions of the FLEX event, this strategy 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 B.5.b pump using suction lift from a source other than the fire header. EC 371626 (Reference 1) identifies the B.5.b 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 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*

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	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, and new connection points in the existing Spent Fuel Pool Cooling Return Line from Shutdown Cooling to allow for the connection of a pre-staged FLEX Makeup pump to provide a path for Spent Fuel Pool makeup. (see Attachment 3 Figures 1 and 5). 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:	
	Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment will be located in areas above the flood level (such as FLEX Generator) or capable of operating submerged (FLEX Makeup Pump). During flood preparations the appropriate connections and equipment set-up will be completed such that actions to support core cooling will be completed before the flood level reaches 517' elevation.
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.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The FLEX Makeup Pumps will be located in the Turbine Building below grade level. The connections for electrical and mechanical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.

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*
For the primary Spent Fuel Pool makeup strategy, FLEX pumps will be pre-staged on each unit in the area of the CCSW pumps. The FLEX Pumps will take suction from the UHS source available at the CCSW pumps and will be connected to the discharge of a CCSW pump on each unit. The CCSW discharge piping will be modified by the installation of a standpipe in the Reactor Building with valve manifolds which will be connected via hoses to the existing Spent Fuel Pool Cooling Return Line from Shutdown Cooling.	Deployment to use the FLEX pumps for Spent Fuel Pool makeup will consist of connecting the discharge piping as well as the electrical power supply for the 480 VAC motor (provided by FLEX portable generator through existing 480 VAC buses). Necessary modifications for deployment include: • Pre-stage 480 VAC FLEX pumps near the CCSW Pumps • Install suction and discharge piping for pre-staged FLEX pumps to allow timely connection • Install electrical supply to pre-staged FLEX pumps to allow timely connection	FLEX pump piping connections will be protected in the area of the existing CCSW pumps located in a lower elevation of the Turbine building. Electrical connections for the FLEX 480 VAC generator are conceptually planned to be located in a structure above the Unit 2 High Radiation Sampling System (HRSS) Building and in the Reactor Building. Both locations are robust against the designated FLEX initiating conditions.

Maintain Spent Fuel Pool Cooling		
BWR Portable Equipment Phase 2:		
		Preliminary review indicates all connections to support the Primary strategy will be inside the current Station power block and therefore inside robust structures. To provide response during flood conditions, appropriate components will be capable of operating submerged and connections above the flood level will be available. FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.

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 (as revised Aug 28, 2013).

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. Phase 1 and 2 strategy will provide sufficient capability that no additional Phase 3 strategies are required. In the event additional equipment is needed portable pumps can utilize the connection points installed in Phase 2 modifications to provide the necessary flow and pressure as outlined in Phase 2 response.	
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*

Maintain Spent Fuel Pool Cooling		
BWR Portable Equipment Phase 3:		
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 (as revised Aug 28, 2013).

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 155ºF after 6 hours which is below the lowest Group 4 Isolation Point of 162ºF 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 during Phase 1.

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 (as revised Aug 28, 2013).

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 following modifications are being proposed to connect a pre-staged generator to provide power to critical loads. Only one pre-staged generator will be required to supply all current FLEX related loads for both units simultaneously.

1. Primary strategy
   Install a seismically qualified, disconnect panel in the vicinity of Bus 28 for unit 2 and Bus 38 for unit 3. Note: all future bus references will be stated as unit 2 then (unit 3), example is Bus 28 (38). One side of the disconnect panel will be connected to Bus 28 (38). The other side of the disconnect panel will have an installed cable to a connection point in the area in which the pre-staged diesel generators will be located. This end of the cable will terminate in a panel with a quick connection mechanism, which will be standard to coordinate with the connections supplied by the Regional Response Centers (RRCs). During a FLEX event, an operator will plug cables with quick connectors from the pre-staged diesel generator output into the panel. Closing the disconnect switch and starting the pre-staged diesel generator will power bus 28 (38). Once this is completed, closing the installed cross-tie breakers will allow Bus 28 (38) to supply power to Bus 29 (39).. See Appendix 3 Figure 4 for a conceptual drawing of this modification.

2. Alternate strategy
   Install a second seismically qualified, disconnect panel in the vicinity of Bus 29 (39). One side of the disconnect panel will be connected to Bus 29 (39). The other side of the disconnect panel will have an installed cable to a connection point in the area in which the pre-staged diesel generators will be located. This end of the cable will terminate in a panel with a quick connection mechanism, which will be standard to coordinate with the connections supplied by the Regional Response Centers (RRCs). During a FLEX event, an operator will plug cables with quick connectors from the pre-

Safety Functions Support
BWR Portable Equipment Phase 2

staged diesel generator output into the panel. Closing the disconnect switch and starting the pre-staged diesel generator will power bus 29 (39). Once this is completed, closing the installed cross-tie breakers will allow Bus 29 (39) to supply power to Bus 28 (38). See Appendix 3 Figure 4 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 pre-staged 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 Generators will be supplied by the quantity of fuel in the tanks located on the skids of the portable equipment. A modification has been proposed to allow transfer of fuel oil from the 2/3 Emergency Diesel Generator (EDG) main fuel oil storage tank to the area of the proposed FLEX Diesel Generators. See Appendix 3 Figure 6 for a conceptual drawing of this modification.

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. A FLEX Truck is available with fuel storage tanks. Fuel oil can be pumped to these tanks and then transported to portable equipment locations.

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 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.*

Safety Functions Support	
BWR Portable Equipment Phase 2	
	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 necessary for phase 2* 1. Installation of a pre-staged FLEX Diesel Generator and associated quick connect capability to supply 480 VAC power to panels located near the ESS Busses. 2. Disconnect panel installation near Bus 28 (38) with associated cabling to provide for connection of a pre-staged or portable AC generator (see Attachment 3 Figure 4) 3. Disconnect panel installation near Bus 29 (39) with associated cabling to provide for connection of a pre-staged or portable AC generator (see Attachment 3 Figure 4) 4. Installation of connection capability and associated temporary hoses from the 2/3 EDG Main Fuel Oil Storage Tank to the area near the pre-staged FLEX Diesel Generators. A pre-staged pump would be connected at the new connection points. The pre-staged pump will be powered from a source capable of being energized by the FLEX Diesel Generator.
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**	

Safety Functions Support	
BWR Portable Equipment Phase 2	
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The connections for electrical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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.

Safety Functions Support	
BWR Portable Equipment Phase 2	
	The FLEX Generators will be located above the maximum flood level in a robust structure over the Unit 2 HRSS Building. The connections for electrical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building at elevations higher than maximum flood level. During flood preparations the appropriate connections and equipment set-up will be completed such that support actions for the Safety Functions will be completed before the flood level reaches 517' elevation.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The connections for electrical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment and associated connections

Safety Functions Support	
BWR Portable Equipment Phase 2	
	will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The connections for electrical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.
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. Pre-staged Phase 2 equipment and associated connections will be located in robust structures. The FLEX Generators will be located in a robust structure above the Unit 2 HRSS Building. The connections for electrical functions will be in the robust structure above Unit 2 HRSS, the Reactor Building or the Turbine Building.

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*
Cables from a a pre-staged diesel powered generator located above the U2 HRSS Building will be connected to quick connect panel. Output cabling from the panel will enter the Reactor Building. Station personnel will start the diesel generator to supply 480 VAC power to the ESS Busses	Electrical power will be supplied by a pre-staged FLEX Diesel Generator through existing 480 VAC buses. Necessary modifications for deployment include: • Install quick connection capability, associated panels and cabling. • Disconnect panels will be	Electrical connections for the FLEX 480 VAC generator are conceptually planned to be located in a structure above the Unit 2 High Radiation Sampling System (HRSS) Building and in the Reactor Building. Both locations

Safety Functions Support		
BWR Portable Equipment Phase 2		
in the Reactor Building.	installed at busses 28, 29, 38 and 39 to support separation between FLEX cabling and permanent plant equipment.	are robust against the designated FLEX initiating conditions. Preliminary review indicates all connections to support the Primary strategies will be inside the current Station power block and therefore inside robust structures. To provide response during flood conditions, the connections and associated equipment will be above the maximum flood level. FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.
Fuel oil will be transferred from the 2/3 EDG Main Fuel Oil Storage Tank to support FLEX Diesel Generator operation.	Piping modifications will be made to the 2/3 EDG Fuel Oil Transfer System to allow connection of a pre-staged pump and hoses. The hoses will transport fuel oil to the FLEX Diesel Generator area for transfer to the skid mounted tanks on the diesels.	The connections and proposed hose routings are conceptually planned to be located in a structure above the Unit 2 High Radiation Sampling System (HRSS) Building, in the 2/3 EDG Room and in the Reactor Building which are robust locations. To provide response during flood conditions, appropriate components will be capable of operating submerged.

Safety Functions Support
BWR Portable Equipment Phase 2
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 (as revised Aug 28, 2013).

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. Phase 1 and 2 strategy will provide sufficient capability that no additional Phase 3 strategies are required. In the event additional equipment is needed portable pumps and generators can utilize the connection points installed in Phase 2 modifications to provide the necessary flow and pressure as outlined in Phase 2 response.	
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 (as revised Aug 28, 2013).		

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
Two (2) low pressure high capacity submersible electrically driven pumps	**X**	**X**	**X**			Minimum 975 gpm	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.
Two (2) 480 VAC Diesel powered Generators	**X**	**X**	**X**	**X**	**X**	Minimum 550 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.

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
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.
Six (6) Industrial blowers					**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.

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) 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.
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.

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) free standing Flood Lights with tripod base					**X**	General usage	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.
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.

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) Dewatering pumps – diesel driven					**X**	General usage	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 SBO DGs are not available.

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

Attachment 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
8	15 mins	Personnel dispatched to investigate SBO DG failure to start.	N	Per FLEX event initial conditions the SBO DGs are not available.
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 hour	Control Room crew has assessed SBO and plant conditions and declares an Extended Loss of AC Power (ELAP) event. • Personnel dispatched to FLEX strategy for supplying make-up water to the Isolation Condenser shell-side. • Personnel dispatched to FLEX strategy for supplying power to the FLEX Makeup Pump and station battery chargers.	N	Time is reasonable approximation based on operating crew assessment of plant conditions

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
13	2 hours	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.
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. HPCI operation is assumed for approximately 2.5 hours in Phase 1.
15	2 hours	Complete actions for loss of Main Control Room Ventilation.	N	DOA 5750-01 actions.
16	2 hours	Defeat HPCI high temperature and flow isolations	N	Ensure HPCI remains available during the event.

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
17	2.5 hours	FLEX strategy for supplying power to 480 VAC busses and associated Motor Control Centers (MCCs) completed.	Y	When the busses are energized, power will be available to the FLEX Makeup Pump. This will also supply power to battery chargers. Preliminary review indicates the batteries will remain available for at least 6 hours without chargers.
18	2.5 hours	FLEX pump connected and ready for use to support Isolation Condenser shell-side makeup.	Y	Due to pre-staging of major components, it is reasonable to expect the FLEX pump can be available within this time period.
19	2.5 hours	Isolation Condenser initiated for RPV pressure control	Y	Complete prior to loss of HPCI to ensure RPV heat removal mechanism operating prior to MAAP analysis assumed HPCI loss.
20	2.5 hours	HPCI assumed to fail due to suppression pool temperature of ≥140°F	N	HPCI may continue to operate above 140°F but it is not relied upon past this point and restoration of the Isolation Condenser will replace the need for HPCI in terms of RPV pressure control.

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
21	3 hours	Isolate both Reactor Recirculation Loops by closing suction and discharge valves	N	Recirc loops are isolated to reduce RPV leakage. The sooner this is accomplished the more reactor inventory is conserved.
22	4 hours	Run hoses from CCSW FLEX Standpipe on 545' elevation to the SBLC Tank.	N	Establishing a makeup source to the tank provides continued availability of a high pressure RPV makeup source.
23	4 hours	Initiate SBLC as necessary for RPV level control.	N	Per MAAP analysis after Recirc Loops are isolated and the Isolation Condenser is controlling reactor pressure, RPV leakage will be reduced to approximately 15 gpm at time = 3.0 hours. Makeup from SBLC can be utilized to maintain RPV level above Top of Active Fuel (TAF).
24	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.

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
25	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 make-up at 12 hours into the event ensures adequate cooling of the spent fuel is maintained.
26	24 hours	Initial equipment from Regional Response Center becomes available.	N	NEI 12-06 assumption.
27	24 hours	Makeup to the RPV using FLEX Makeup pump strategy is available.	N	SBLC is available as a high pressure injection source. Low pressure makeup from FLEX Makeup Pump will not be required before this time.
28	24-72 hours	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 1B
NSSS Significant Reference Analysis Deviation Table

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771 P Page	Plant Applied Value	Design Value	Gap and Discussion
NEDC-33771P Rev 1 Section 4.5.1.1 (BWR/2/3. Mark I and EC System Assumptions) and Table 4.5.2-1 Appendix A are closest to the Dresden Nuclear Power Station and associated response. Differences between the GEH SHEX case and the MAAP analysis of the Dresden strategy are listed below.						
Input Parameter Values						
1	Core thermal power	Proprietary information. Refer to report for value.	15	2957 MWT	NA	The GEH model BWR 2/3 Mark I reference plant has lower core thermal power rating.
2	Primary System Leakage	Proprietary information. Refer to report for value.	15	61 gpm	NA	The reference plant has 5 Recirculation Loops which results in a higher value for Recirc Pump seal leakage. Dresden has 2 Recirculation Loops per reactor.
3	Emergency Condenser capacity	Proprietary information. Refer to report for value.	15	$2.52E+10^{8}$ Btu/hr	$2.52E+10^{8}$ Btu/hr	The reference plant has 2 Emergency Condensers whereas Dresden has 1 Isolation Condenser.
4	Wetwell Free Volume	Proprietary information. Refer to report for value.	16	110,618 ft^3	NA	The differences in reference plant structural design and minor differences in assumed parameter values at time zero should have a negligible effect on the progression of the event after a few hours.
5	Wetwell airspace temperature	Proprietary information. Refer to report for value.	16	95°F	NA	
6	Initial Wetwell Pressure	Proprietary information. Refer to report for value.	16	14.7 psia	NA	

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771 P Page	Plant Applied Value	Design Value	Gap and Discussion
7	Intial Wetwell humidity	Proprietary information. Refer to report for value.	16	100%	NA	
8	Suppression Pool Volume	Proprietary information. Refer to report for value.	16	118,630 ft^3	NA	
9	Suppression Pool initial temperature	Proprietary information. Refer to report for value.	16	95°F	NA	
10	Drywell Free Volume	Proprietary information. Refer to report for value.	16	158,236 ft^3	NA	
11	Initial Drywell Temperature	Proprietary information. Refer to report for value.	16	150°F	NA	
12	Initial Drywell Pressure	Proprietary information. Refer to report for value.	16	15.7 psia	NA	
13	Initial Drywell Humidity	Proprietary information. Refer to report for value.	16	50%	NA	

Item	Parameter of Interest	NEDC-33771P Rev 2 Value	NEDC-33771 P Page	Plant Applied Value	Design Value	Gap and Discussion
Resultant Parameter Values						
	Maximum Drywell Pressure	Proprietary information. Refer to report for value.	40	30.3 psia at t_0 + 24 hrs	62 psig	
	Maximum Drywell Temperature	Proprietary information. Refer to report for value.	40	260°F at t_0 + 24 hrs	281°F	
	Maximum Wetwell Pressure	Proprietary information. Refer to report for value.	40	28.5 psia at t_0 + 24 hrs	62 psig	
	Maximum Wetwell Airspace Temperature	Proprietary information. Refer to report for value.	40	146°F at t_0 + 24 hrs	281°F	
	Maximum Suppression Pool Temperature	Proprietary information. Refer to report for value.	40	140°F at t_0 + 24 hrs	N/A	

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 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		• Validate Strategy Procedures (NEI 12-06, Sect. 11.4.3)	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 (as revised Aug 28, 2013).

Attachment 3
Conceptual Sketches

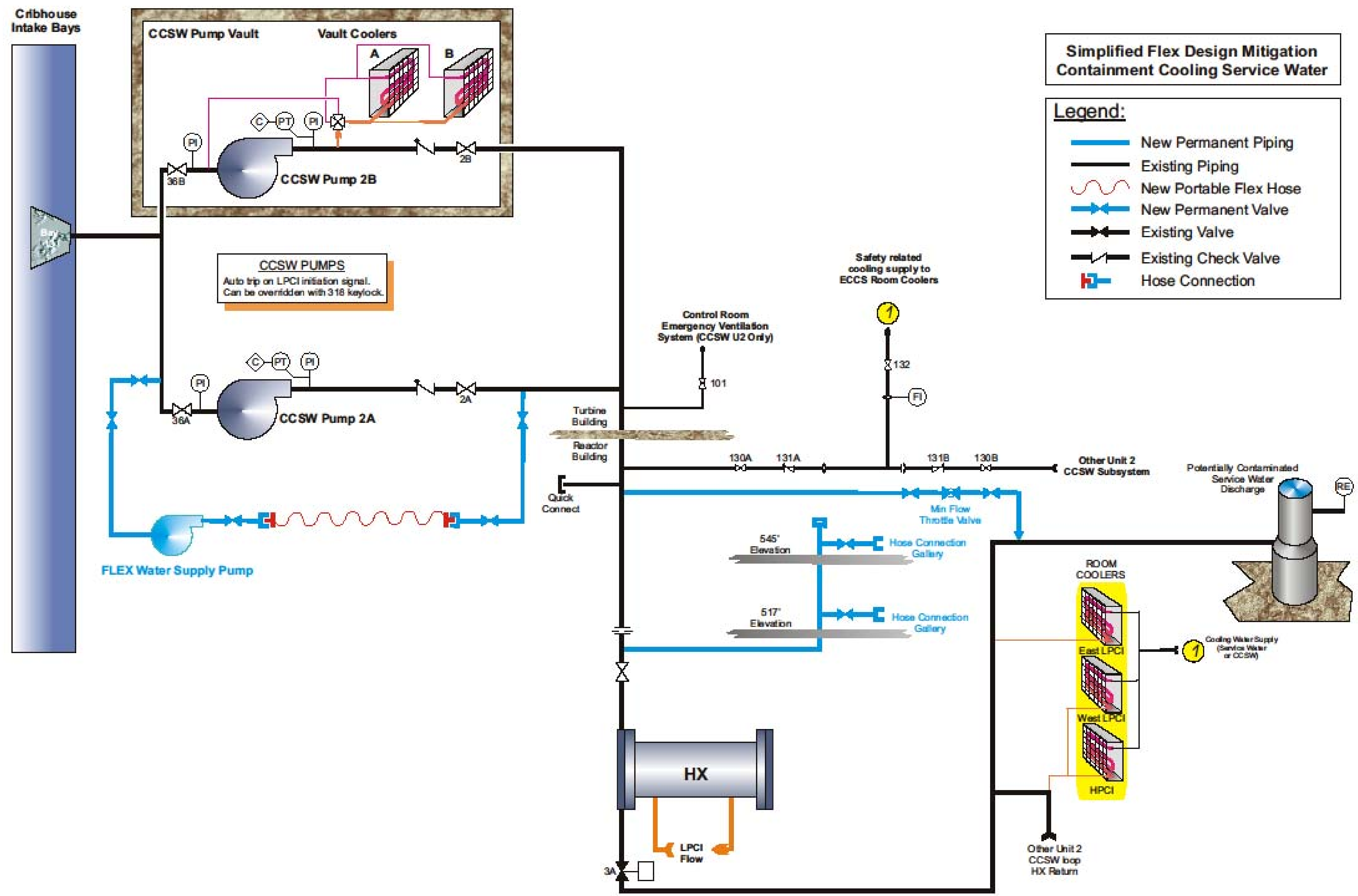


Figure 1 - FLEX Makeup Pump

Attachment 3
Conceptual Sketches

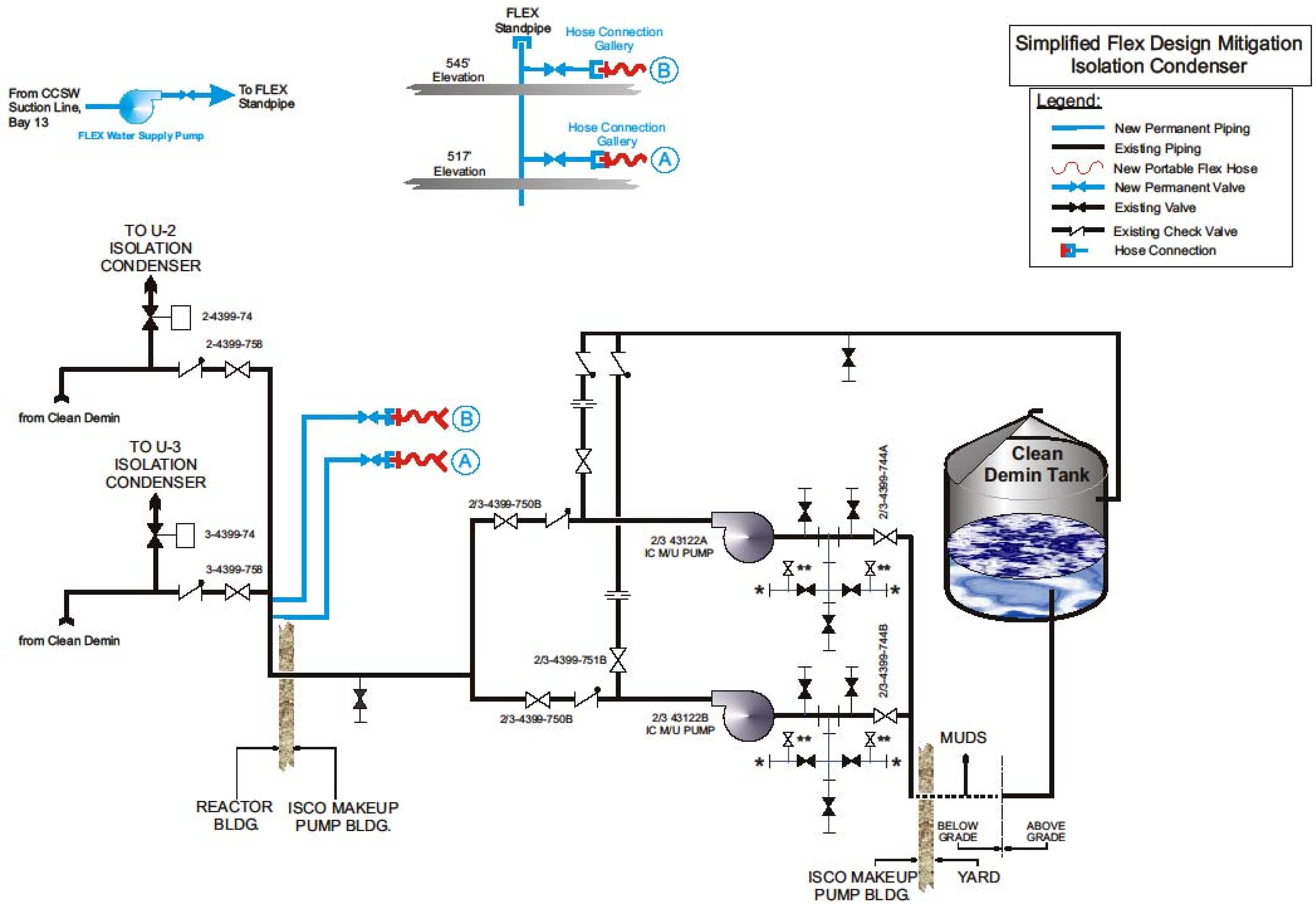


Figure 2 - Isolation Condenser Shell-side Makeup

Attachment 3
Conceptual Sketches

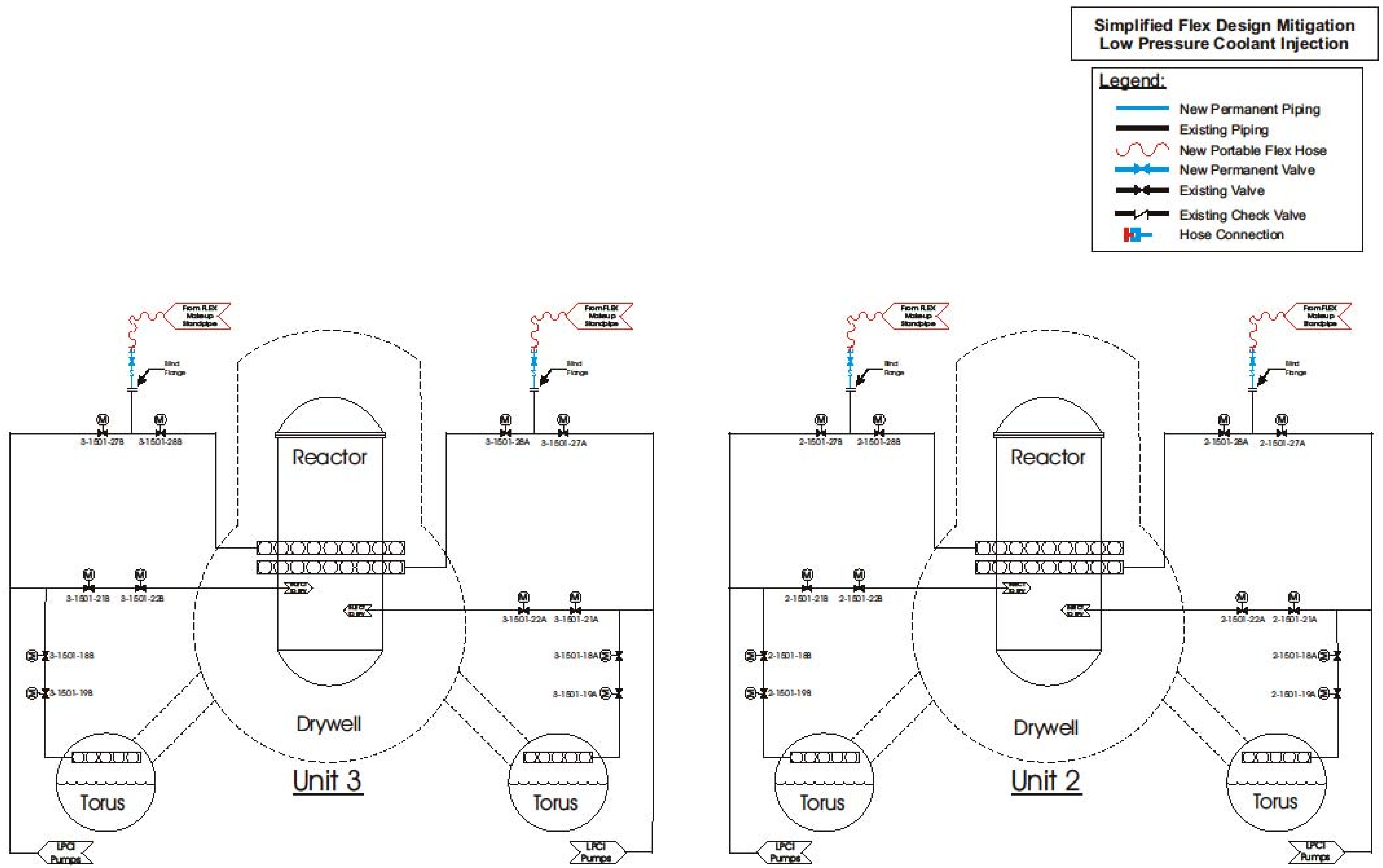


Figure 3 - RPV Makeup

Attachment 3
Conceptual Sketches

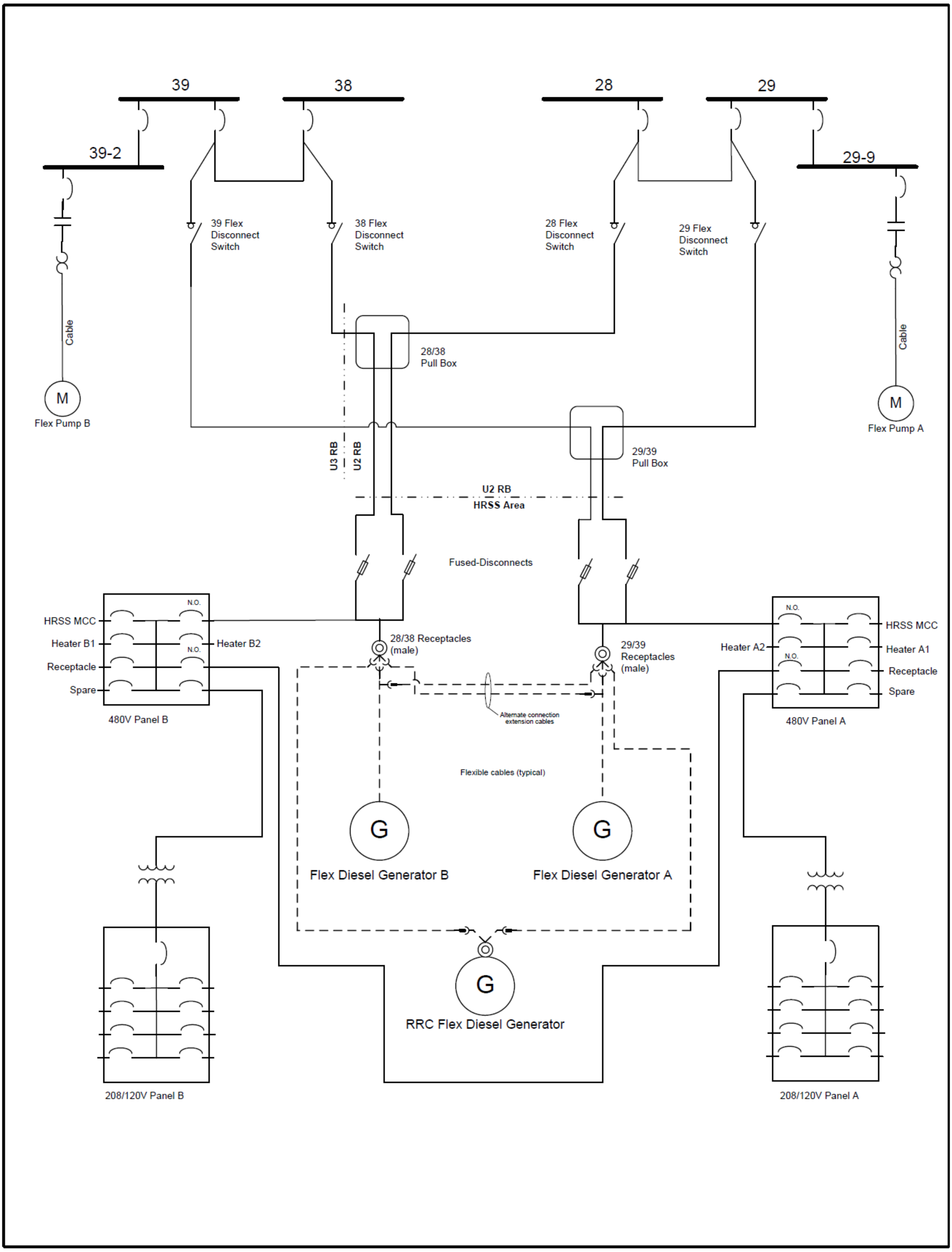
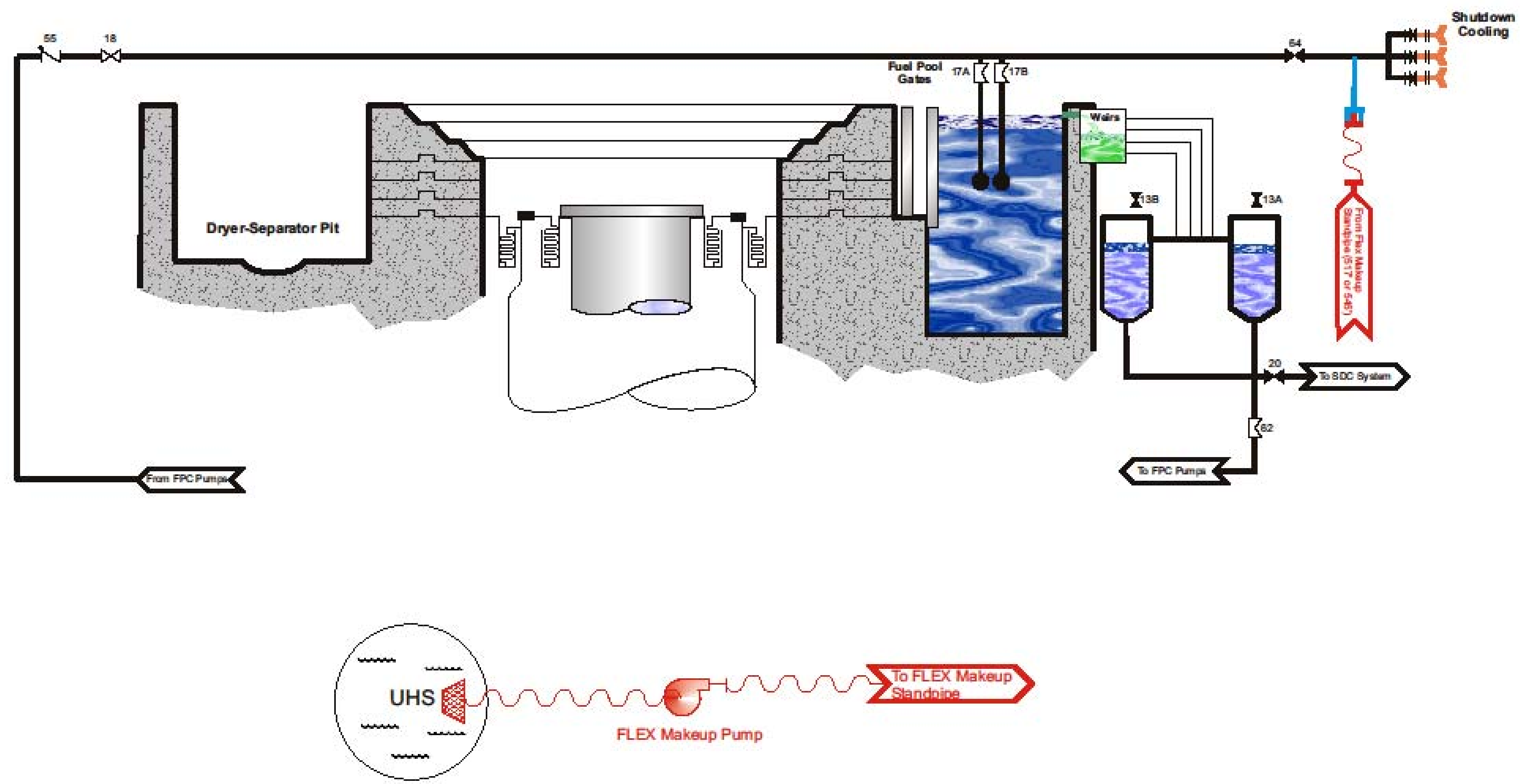


Figure 4 - Connection of external power source to 480 VAC Distribution

Attachment 3
Conceptual Sketches



Simplified Flex Design Mitigation
Spent Fuel Pool Cooling

Figure 5 - Spent Fuel Pool Makeup

Attachment 3
Conceptual Sketches

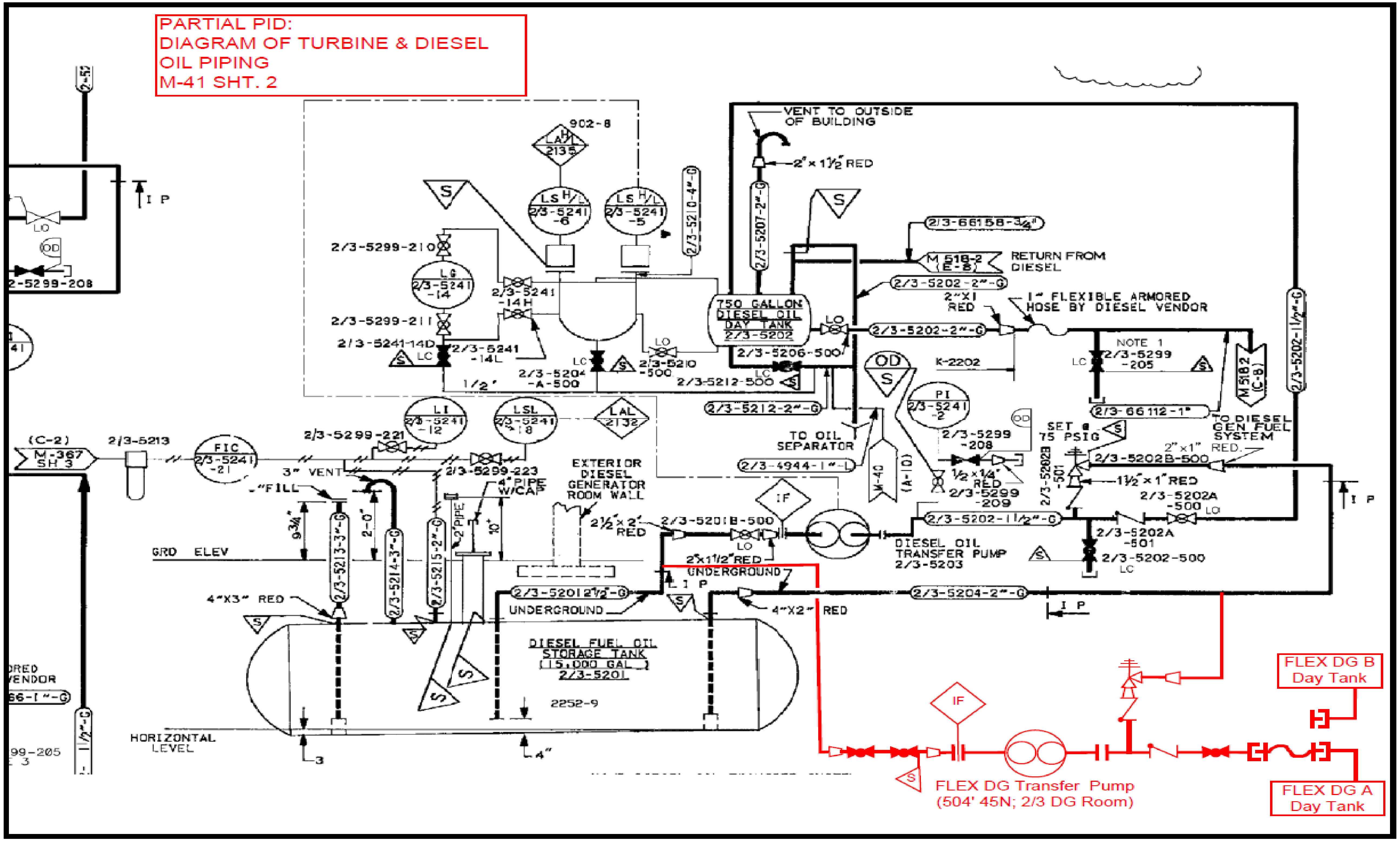


Figure 6 – FLEX Fuel Oil Transfer