December 16, 2015

NRC 2015-0072
10 CFR 50.54(f)

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

Point Beach Nuclear Plant, Units 1 and 2
Docket 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

NextEra Energy Point Beach, LLC's Notification of Full Compliance with Order EA-12-049 Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events and Submittal of Final Integrated Plan

References:

1. NRC Order Number EA-12-049, Order To Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012 (ML 12073A195)
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 (ML 12233A042)
3. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012 (ML 12221A205)
4. NextEra Energy Point Beach, 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 26, 2012 (ML12305A201)
5. NextEra Energy Point Beach, LLC'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 22, 2013 (ML13053A401)
6. NextEra Energy Point Beach, LLC's 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), dated August 28, 2013 (ML13241A202)
7. Point Beach Nuclear Plant, Unit 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) dated January 27, 2014 (TAC Nos. MF0725 and MF0726) (ML13338A510)
8. NextEra Energy Point Beach, LLC's Second 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), dated February 28, 2014 (ML14062A073)

9. NextEra Energy Point Beach, LLC's Third 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), dated August 28, 2014 (ML14241A266)
10. NextEra Energy Point Beach, LLC's Fourth 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), dated February 24, 2015 (ML15050A487)
11. NextEra Energy Point Beach, LLC's Fifth 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), dated August 28, 2015 (ML15240A028)
12. NextEra Energy Point Beach, LLC's Full Compliance Report for the March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated December 19, 2014 (ML14353A047, ML14353A048)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to NextEra Energy Point Beach, LLC (NextEra). Reference 1 was immediately effective and directed NextEra 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 were 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 NextEra initial status report regarding mitigation strategies. Reference 5 provided the NextEra Overall Integrated Plan. References 6, 8, 9, 10 and 11 provided the first, second, third, fourth and fifth six-month status reports, pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. Condition C.3 of Reference 1 requires all licensees to report to the Commission when full compliance with the requirements of Order EA-12-049 is achieved and is the subject of this letter. Reference 12 provided notification of full compliance with Order EA-12-051 regarding reliable spent fuel pool indication. The Final Integrated Plan (Attachment 5 to this letter) includes a summary of compliance with Order EA-12-051.

This letter provides notification that NextEra has completed the requirements of Order EA-12-049 and is in full compliance with the Order for Point Beach, Units 1 and 2. The attachments to this letter provide summaries of how the compliance requirements were met, the completion status for all of the FLEX Audit open and confirmatory items in Reference 7, and the Final Integrated Plan.

This letter contains no new regulatory commitments.

If you have any questions please contact Mr. Bryan Woyak, Licensing Manager, at (920) 755-7599.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 16, 2015.

Very truly yours,

NextEra Energy Point Beach, LLC

Eric McCartney
Site Vice President

Attachment 1: Order EA-12-049 Compliance Summary

Attachment 2: Overall Integrated Plan Pending Actions Summary

Attachment 3: NRC Interim Staff Evaluation Open and Confirmatory Items Summary

Attachment 4: FLEX Audit Open Item Closure Summary

Attachment 5: Final Integrated Plan in Response to Order EA-12-049

cc: Director, Office of Nuclear Reactor Regulation
Administrator, Region III, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Ms. Lisa M. Regner, NRR/JLD/PMB, USNRC
Mr. Blake A. Purnell, NRR/JLD/PMB, USNRC
Mr. Steven R. Jones, NRR/DSS/SBPB, USNRC

ATTACHMENT 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

ORDER EA-12-049 COMPLIANCE SUMMARY

ORDER EA-12-049 COMPLIANCE SUMMARY

Point Beach, Units 1 and 2 (Point Beach), developed an Overall Integrated Plan (Reference 3) documenting the diverse and flexible strategies (FLEX) in response to Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (Reference 1). The information provided herein documents full compliance with Order EA-12-049 for Point Beach.

Milestone Schedule

All activities on the Milestone Schedule for Point Beach are now complete.

Milestone	Unit 1 Completion Date	Unit 2 Completion Date
Submit 60 Day Status Report	Oct 2012	Oct 2012
Submit Overall Integrated Plan	Feb 2013	Feb 2013
Submit 6 Month Updates:		
Update 1	Aug 2013	Aug 2013
Update 2	Feb 2014	Feb 2014
Update 3	Aug 2014	Aug 2014
Update 4	Feb 2015	Feb 2015
Update 5	Aug 2015	Aug 2015
Validation:		
Complete Analyses Supporting FLEX Strategies	Feb 2015	Feb 2015
Complete Final Time Constraint Validations	Sep 2015	Sep 2015
Complete the Phase 2 Staffing Assessment	May 2015	May 2015
Complete Final Walkthrough Validation	Sep 2015	Sep 2015
Modifications:		
Initiate Engineering Changes for Modification Development	Mar 2013	Mar 2013
Complete Unit 2 and Common Non-Outage Modifications	N/A	Sep 2015
Unit 1 Implementation Outage	*	N/A
Complete Unit 1 Non-Outage Modifications	N/A	Sep 2015
Unit 2 Implementation Outage	N/A	Oct 2015

Milestone	Unit 1 Completion Date	Unit 2 Completion Date
Storage:		
Complete Construction of the FLEX Storage Facility	Sep 2015	Sep 2015
FLEX Equipment:		
Initiate Procurement of Remaining FLEX Equipment	Aug 2013	Aug 2013
Receive Remaining FLEX Equipment	Sep 2015	Sep 2015
Complete Regional Resource Center (RRC) Offsite Delivery Arrangements	Aug 2015	Aug 2015
Procedures:		
Complete Revisions to Site Emergency Response Procedures	Sep 2015	Sep 2015
Complete Draft FLEX Support Guidelines for Training	Mar 2015	Mar 2015
Complete Maintenance and Operations Procedures Related to FLEX Equipment Storage, Maintenance and Testing	Sep 2015	Sep 2015
Complete FLEX Administrative Program Implementation (Unit 2)	N/A	Oct 2015
Revise FLEX Administrative Program for Unit 1	Oct 2015	N/A
Training:		
Complete Training Development	Mar 2015	Mar 2015
Complete Applicable Training for Unit 2 and Common FLEX Strategy Implementation	N/A	Oct 2015
Complete Applicable Training for Unit 1 FLEX Strategy Implementation	Oct 2015	N/A
Implementation:		
Unit 1 Implementation Completion	Oct 2015*	N/A
Unit 2 Implementation Completion	N/A	Oct 2015
Full Site FLEX Implementation	Oct 2015	Oct 2015
Submit Completion Report	Dec 2015	Dec 2015

*Unit 1 implementation occurred following completion of Common Unit modifications and concurrent with Unit 2 implementation.

A declaration of completion of the major elements of the FLEX strategy follows.

Strategies/Validation - Complete

Point Beach FLEX implementation strategies are in compliance with Order EA-12-049. The Overall Integrated Plan (OIP) Pending Actions and Interim Staff Evaluation (ISE) Open Items and Confirmatory Items have been addressed and are summarized in Attachments 2 and 3.

Point Beach has completed validation and verification activities to ensure the capability to implement the FLEX strategies in accordance with industry developed guidance.

The Phase 2 Staffing Study for Point Beach has been completed in accordance with 10 CFR 50.54(f), "Request for Information Pursuant to Title 10 of the Code of Federal Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force review of Insights from the Fukushima Dai-ichi Accident," Recommendation 9.3, dated March 12, 2012 (Reference 2), as documented in a letter dated May 28, 2015 (Reference 8).

Modifications – Complete

The Phase 1, 2 and 3 modifications required to support the FLEX strategies for Point Beach have been fully implemented in accordance with the station design control process.

Equipment Storage – Complete

A FLEX Storage Facility has been established and is fully functional to house designated portable equipment to implement the FLEX strategies. The FLEX Storage Facility meets the requirements for protection from the applicable site hazards. The designated portable equipment is properly stored in the designated configuration within the FLEX Storage Facility or within existing Class 1 structures.

Equipment Procurement – Complete

The equipment required to implement the FLEX strategies for Point Beach has been procured in accordance with NEI 12-06, Section 11.1 and 11.2, received at Point Beach, initially tested or has its performance verified as identified in NEI 12-06, Section 11.5, and is available for use.

Maintenance and testing will be conducted through the use of the Point Beach Preventative Maintenance program such that equipment reliability is maintained.

Point Beach has established a contract with Pooled Equipment Inventory Company (PEICo) and has joined the Strategic Alliance for FLEX Emergency Response (SAFER) Team Equipment Committee for off-site facility coordination. Point Beach validated that PEICo is ready to support the site with Phase 3 equipment stored in the Regional Response Centers in accordance with the site specific SAFER Response Plan.

Procedures – Complete

FLEX Support Guidelines (FSG) for Point Beach have been developed, validated and integrated with existing procedures. The FSGs and affected existing procedures are effective and issued for use in accordance with the site procedure control program.

A NextEra Fleet FLEX Program Document has been developed in accordance with the requirements of NEI 12-06. The FLEX Program Document is effective and issued in accordance with the site/fleet procedure control program. The document includes, but is not limited to, roles and responsibilities, regulatory requirements, a description of the FLEX strategies and procedure implementation.

Training – Complete

Training for implementation of the FLEX strategies has been completed in accordance with NEI 12-06, Section 11.6.

References

The following references support the Point Beach FLEX compliance declaration:

1. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012 (ML12073A195)
2. 10CFR50.54(f), "Request for Information Pursuant to Title 10 of the Code of Federal Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force review of Insights from the Fukushima Dai-ichi Accident," Recommendation 9.3, dated March 12, 2012 (ML12073A348)
3. NextEra Energy Point Beach, LLC'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 22, 2013 (ML13053A401)
4. NextEra Energy Point Beach, LLC's 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), dated August 28, 2013 (ML13241A202)
5. NextEra Energy Point Beach, LLC's Second 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), dated February 28, 2014 (ML14059A086)
6. NextEra Energy Point Beach, LLC's Third 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), dated August 28, 2014 (ML14241A266)
7. NextEra Energy Point Beach, LLC's Fourth 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), dated February 24, 2015 (ML15050A487)
8. NextEra Energy Point Beach to US NRC Document Control Desk, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 9.3 of the

Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Emergency Preparedness – Phase 2 Staffing Assessment, dated May 28, 2015 (ML15148A679)

9. NextEra Energy Point Beach, LLC's Fifth 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), dated August 28, 2015 (ML15240A028)

ATTACHMENT 2

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

OVERALL INTEGRATED PLAN PENDING ACTIONS SUMMARY

OVERALL INTEGRATED PLAN PENDING ACTIONS SUMMARY

The following Overall Integrated Plan (OIP) pending actions were reported as complete in the Fifth Six-Month Update dated August 28, 2015:

OIP Pending Action	
1	A DC load management strategy will be developed. It will include a formal evaluation to verify available DC power time and validate the time constraints to initiate and complete load stripping activities. The battery load management strategy will include power to credited installed equipment (e.g., DC motor operated valves, solenoid operated valves, etc.) and at least one channel of credited instrumentation during Phase 1. The time constraint to have battery chargers energized and aligned prior to battery depletion will be validated.
2	An evaluation will be performed to determine whether service water (SW) system return and non-seismic/missile protected portions of the SW system isolation will be required to ensure adequate flow to the suction of the turbine driven auxiliary feedwater (TDAFW) pump.
4	Formal MAAP or other comparable analysis and evaluations will be performed to demonstrate the adequacy of the mitigation strategies for core cooling in all plant operating MODES.
5	A containment environmental analysis will be performed based on the use of low leakage reactor coolant pump (RCP) seals and the FLEX mitigation strategy.
6	An analysis will be performed to demonstrate the adequacy of the primary auxiliary building (PAB) environment for equipment and personnel access during SFP boiling. The requirements for opening doors to establish a vent path will be determined. Administrative guidance will be created based on this analysis.
7	A spent fuel pool (SFP) makeup water connection point will be added to the suction of P-9 pump. The P-9 pump and associated piping which is currently not seismic class I will be evaluated and upgraded as necessary to make it seismically robust.
8	T-30, Diesel Fire Pump Fuel Tank and related piping will be evaluated for seismic loading and upgraded as necessary.
9	The need for additional lighting will be evaluated as FSGs are developed.
11	The portable 480 VAC generator secondary connection points will be designated.
12	Cable spreading room will reach 120°F at approximately 1 hour 16 minutes; the ability to meet the time constraint will be validated.
13	An overall diesel refueling plan will be developed based on final FLEX diesel driven component fuel consumption requirements that specifies refueling frequency and time requirements. The time constraint based on fuel oil consumption of the diesel driven fire pump (DDFP) will be validated.
14	Further evaluation will be required to address the need for extended operation at low steam generator (SG) pressures and low decay heat loads.
18	Seismically harden the condensate storage tanks (CSTs) and missile protect the bottom six feet to provide additional coping time for aligning the DDFP to the SW System and to the suction of the TDAFW pump.
21	Cross connect piping will be installed between the Unit 1 and Unit 2 TDAFW pumps' steam exhaust lines, steam supply lines and pump discharge lines.
22	Connection points for a portable diesel driven pump will be added to the residual heat removal (RHR) system for injecting into the RCS.
24	Flanged hose adapters will be fabricated to facilitate connection of the portable diesel driven charging pump (PDDCP) to the primary and secondary connection points without modification to permanent plant equipment. The hose adapters for each connection point will be pre-staged and stored with the skid pumps.
25	Install portable diesel generator (PDG) connection points at 1B-03 and 2B-04.

OIP Pending Action	
26	Modifications to facilitate the connection of a PDG to the 1-A06 and 2-A06 4.16 kV switchgear will be performed.
27	The steam generator storage building (SGSB) will be analyzed for seismic and tornado loading to qualify it for FLEX purposes. The west wall of the SGSB will require additional evaluation and modification to ensure that it satisfies the FLEX requirements.
28	Evaluate the technical support center (TSC) 18.5 foot level for adequacy of storing miscellaneous FLEX strategy equipment.
29	Formalize an evaluation that demonstrates adequate shutdown margin can be maintained during cooldown without establishing letdown and injecting water from the RWST.
31	Specific actions per AOP-30, "Temporary Ventilation for Vital Areas," will be developed to account for the loss of all AC power. Additional analysis will be performed to determine what additional time may be gained by opening cabinets and area doors.
32	Validate the adequacy of the existing B.5.b pumps for use during Phase 2 Core Cooling and Heat Removal.
33	Develop performance requirements for Phase 2 and 3 portable equipment following completion of required analyses and modification design efforts.
35	If the non-safety related batteries are required to be credited as part of the battery load management strategy, they will be evaluated and upgraded as necessary to make them seismically robust and tornado missile protected.

The remaining Overall Integrated Plan (OIP) pending actions are now complete:

OIP Pending Action		Completion Notes
3	Based on the results of the evaluation (Pending Action 2) required Operator actions to isolate SW will be time validated.	Final time validation to align fire water to the service water system to supply the turbine driven AFW pump is complete. A timed walkthrough of FSG-2 was completed utilizing multiple operations personnel of varying levels of experience. The time to complete the evolution is documented as 25 minutes.
10	The deployment of credited FLEX equipment to the designated primary and secondary connection points within the required time frame will be resource and time validated.	Deployment of credited FLEX equipment time validation was included in the time validation studies to address Pending Action #15.
15	Time validation studies will be conducted to justify the time constraints and resources necessary for implementing the Point Beach Nuclear Plant (PBNP) FLEX strategies. These will be performed in accordance with PBNP Operations Manual OM 4.3.8, "Control of Time Critical Operator Actions."	Timed validations were conducted for the items listed as time constraints (time sensitive actions) in the Final Integrated Plan, Attachment A, Sequence of Events Timeline. The validations were conducted utilizing the guidance provided by NEI 12-06, Revision 1A, Appendix E, Validation Guidance. An integrated review of the validation process was performed to ensure adequate resources are available to accomplish the FLEX strategy as a whole. The Staffing assumptions are based on NEI 12-01. OM 4.3.8, Control of Time Critical and Time Sensitive Operator Actions, provides a listing of time sensitive actions for FLEX strategies. OM 4.3.8 states that the FLEX validations should be conducted with the guidance provided in NP 7.7.36, Diverse and Flexible Coping Strategies, FLEX Program. The validation process and results are included in Attachment A of NP 7.7.36.

OIP Pending Action		Completion Notes
16	Point Beach will develop strategy implementing procedures and FLEX support guidelines including the following: • Provide guidance for manual actions to implement auxiliary feed water (AFW) steam and discharge line alignment • Provide guidance for operators to provide steam or AFW flow from opposite Unit when required • Procedurally control maintaining one accumulator available in Modes 5 and 6 with SGs unavailable.	FSG-7 was developed to provide guidance to manually control the turbine driven AFW pump and control SG pressure with manual control of the atmospheric steam dump valves. FSG-15 was developed to allow either Unit's turbine driven AFW pump to feed both Units' Steam Generators. FSG-15 provides guidance to allow steam from either Unit to supply the operating turbine driven AFW pump. The following procedures were revised to ensure that an SI Accumulator is available in Modes 5 and 6: OP-3C for Units 1 and 2, OP-1A for Units 1 and 2, OP-4A, OP-4D Part 1, CL-7B for Units 1 and 2, and NP 10.3.6.
17	Systematic approach to training (SAT) will be used to evaluate training requirements for station personnel based upon changes to plant equipment, implementation of FLEX portable equipment, and new or revised procedures that result from implementation of the FLEX strategies.	The SAT process was used for the development and conduct of training. Training for implementation of the FLEX strategies was completed in accordance with NEI 12-06, Section 11.6.
19	Harden existing diesel driven fire pump to meet seismic requirements. Install a cross connect between fire water and the SW system to supply the TDAFW pump suction. The cross connect to SW will also have a connection point for a portable diesel driven pump (PDDP).	Engineering Change (EC) 259770 replaced the diesel driven fire pump (DDFP) and fuel oil tank with seismically qualified equipment. A cross connection between fire water and service water was installed to provide water to the TDAFW pump suction. The connection point for the PDDP has been changed from the cross connection line to the use of one or multiple SW pump discharge check valve(s). The check valve cover will be removed and an adapter installed. The adapter has been prefabricated and is stored with FLEX equipment. This connection is a backup to the DDFP or may be used during Phase 3. Use of the connection point is described in FSG-5, Initial Assessment and FLEX Equipment Staging.
20	A compressed gas backup will be installed for the accumulator fill valves to allow the boric acid to be injected into the reactor coolant system (RCS) in a controlled manner.	EC 279035 and EC 279036 are complete. The ECs provide backup nitrogen from the associated SI Accumulator to the accumulator fill valve. This alignment is only required during outages to support Mode 5 and 6 strategies.
23	Install low leakage RCP seals to decrease RCP seal leakage and increase the time to core uncovery.	Unit 1 RCP seals were replaced with Westinghouse SHIELD® Generation 3 low leakage/shutdown seals during the Fall 2014 refueling outage. Unit 2 RCP seals were replaced with Westinghouse SHIELD® Generation 3 low leakage/shutdown seals during the Fall 2015 refueling outage.
30	Required operator actions to cross connect the TDAFW pump discharge and steam supply lines will be time validated.	Time validations were completed to cross-connect the TDAFW pumps on both the discharge side and the steam side. See OIP Pending Actions 15 and 16.

<table>
<tr><th colspan="2">OIP Pending Action</th><th>Completion Notes</th></tr>
<tr><td>34</td><td>The Phase 2 staffing study for FLEX will include an assessment of communications for FLEX activities.</td><td>Communication was part of the Phase 2 staffing assessment field walkdowns and table top discussions performed for each of the FLEX Support Guidelines. Communication methods needed to complete the FSGs was one of the topics covered during the table top review. Radios are the primary method of communication with face to face communication being the secondary method.</td></tr>
<tr><td>36</td><td>Point Beach will implement a FLEX Program stipulating the required administrative controls to be implemented. The program will include:
FLEX equipment procurement requirements.
Plant configuration control procedures to assure plant physical changes will not adversely impact the approved FLEX strategies.
Complete Maintenance and Operations Procedures related to FLEX Equipment Storage, Maintenance, and Testing.
Deployment strategy administrative requirements that address all MODES of operation and requirements to keep routes and staging areas clear or invoke contingency actions.</td><td>Point Beach has implemented a FLEX Program stipulating the required administrative controls to maintain FLEX design control, configuration control, operation, maintenance, testing and deployment. The following procedures have been developed or revised and issued to implement these requirements:
EN-AA-110, Diverse and Flexible Coping Strategies Program
NP 7.7.36, Diverse And Flexible Coping Strategies (FLEX) Program
EN-AA-202-1001, Engineering Change Scope and Screening
OM 3.42, Control of WR SFP Level Instrumentation & Credited FLEX Equip
PC 101, FLEX / B.5.b Implementation Verification During Outages
MWO 40255820, FLEX Yard Staging Area And Deployment Route Inspections. This Model Work Order has a weekly performance frequency.
All of the strategy implementing procedures, testing procedures, administrative procedures and PB routine tasks required to implement and maintain FLEX have been issued.</td></tr>
</table>

ATTACHMENT 3

NEXTERA ENERGY POINT BEACH, LLC

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

NRC INTERIM STAFF EVALUATION OPEN AND CONFIRMATORY ITEMS SUMMARY

NRC INTERIM STAFF EVALUATION OPEN AND CONFIRMATORY ITEMS SUMMARY

NRC Interim Staff Evaluation Open Items

Point Beach considers all Interim Staff Evaluation Open Items to be resolved. The requested information in response to the Open Items was made available to the NRC staff during the NRC onsite FLEX Audit conducted June 8-12, 2015. The NRC staff had no additional questions or requests for information.

Open Item Number	Description
3.2.1.1.B	The licensee needs to complete an acceptable analysis for the Significant RCS inventory and core cooling strategy. The licensee has not finalized what thermal-hydraulic code and evaluation model will be used for the analysis.
3.2.1.2.C	The licensee needs to perform the RCS analysis and demonstrate the acceptability of the analytical modeling for the RCP seal leakage, including modeling the leak area, computing the leakage flow, two-phase leakage modelling, and the pressure dependence of the leak rate.
3.2.1.8.A	Confirm resolution of the generic concern associated with the modeling of the timing and uniformity of the mixing of a liquid boric acid solution injected into the reactor coolant system under natural circulation conditions potentially involving two-phase flow.

NRC Interim Staff Evaluation Confirmatory Items

Point Beach considers all Interim Staff Evaluation Confirmatory Items to be resolved. The requested information in response to the following Confirmatory Items was made available to the NRC staff during the NRC onsite FLEX Audit conducted June 8-12, 2015. The NRC staff had no additional questions or requests for information on the following items:

Confirmatory Item	Description
3.1.1.1.A	Protection of FLEX Equipment – Confirmation of the final design and location of new structures or modification of existing structures for the storage and protection of FLEX equipment against all applicable external hazards is needed.
3.1.1.2.A	The licensee should confirm that there is at least one connection point for FLEX equipment requiring access via routes only through seismically robust structures.
3.1.1.3.A	The licensee needs to provide guidance to operators for critical actions to perform until alternate indications can be connected and for controlling critical equipment without associated control power.
3.1.1.4.A	Confirm the location of the receiving area for offsite resources, and identify the methods to be used to deliver equipment from the receiving area to the site staging area.
3.1.2.2.A	Confirm that connection points for portable equipment are protected from flooding.
3.1.3.2.A	The licensee needs to identify debris removal equipment needed for Phase 2 following a high wind event. (The licensee plans to complete an assessment in the first quarter of 2014.)
3.1.4.2.A	The licensee needs to identify the necessary equipment for the removal of snow and ice to ensure that FLEX equipment can be transported from storage to its location for deployment.

Confirmatory Item	Description
3.2.1.A	In light of the potential for consequential damage to the atmospheric dump valves (ADV), the licensee should complete the analysis of the ELAP scenario with an asymmetric cooldown and demonstrate acceptable results and/or otherwise demonstrate the acceptability of using a single-loop cooldown strategy for ELAP mitigation.
3.2.1.1.A	Reliance on the NOTRUMP code (or other thermal-hydraulic code) for the ELAP analysis of Westinghouse plants is limited to the flow conditions before reflux condensation initiates. This includes specifying an acceptable definition for reflux condensation cooling. The licensee should confirm the applicability of this approach for PBNP.
3.2.1.2.A	Qualification testing should be completed demonstrating a maximum seal leakage rate no greater than 1 gpm/pump for the SHIELD® low-leakage seal design under ELAP conditions. This qualification and the resulting leakage rate should be shown applicable to the RCP design at PBNP. The information provided should address the impacts of the Westinghouse 10 CFR Part 21 report, "Notification of the Potential Existence of Defects Pursuant to 10 CFR Part 21," dated July 26, 2013 (ML13211A168), on the use of the low seal leakage rate in the ELAP analysis.
3.2.1.2.B	RCP seals - If the seals are changed to the newly designed Generation III SHIELD® seals, or non-Westinghouse seals, the acceptability of the use of the newly designed Generation III SHIELD® seals, or non-Westinghouse seals should be addressed, and the RCP seal leakages rates for use in the ELAP analysis should be provided with acceptable justification.
3.2.1.2.D	The licensee needs to address whether the restoration of cooling to the SHIELD® seals would be attempted and, if so, demonstrate that thermal shock from restoration of seal cooling would not adversely affect the RCP SHIELD® seals planned for installation at Point Beach.
3.2.1.6.A	Confirm resolution of Integrated Plan statement that a CST volume is adequate to support decay heat removal for 1 hour 20 minutes and an audit response that states it is adequate for approximately 1.9 hours.
3.2.1.6.B	Confirm that the methodology in Attachment 1 of the PWROG Core Cooling Interim Position Paper was properly utilized to determine the 200 psig constraint for accumulator isolation.
3.2.1.8.B	The Licensee needs to complete the motive force calculation for the TDAFW pump and demonstrate that it will be capable of performing its function at the point depressurization is terminated as identified in the integrated plan.
3.2.1.9.A	The Integrated Plan indicates use of additional B.5.b pumps as FLEX pumps; however it does not describe their capacity, qualification, protection, and deployment.
3.2.4.4.A	The NRC staff has reviewed the licensee communications assessment (ML12305A538 and ML13053A400) and has determined that the assessment for communications is reasonable. Confirmation is required to demonstrate that upgrades to the site's communications systems have been completed.
3.2.4.5.A	The Integrated Plan does not identify whether personnel access may be adversely affected by the loss of the preferred or Class 1E power supplies in an ELAP. The licensee should identify whether access may be affected, and if so, identify any additional actions necessary to ensure that operators have access to areas where manual actions are specified in ELAP response procedures/guidance.
3.2.4.6.C	Confirm development of procedures and guidance to address human performance aids (installation sketches that include identification of connection points and the suggested layout of hoses, cables and portable equipment; additional equipment marking), to ensure successful completion of the FLEX strategies.
3.2.4.8.A	Need to confirm that appropriately sized FLEX DGs are procured.

Confirmatory Item	Description
3.2.4.10.A	The licensee needs to complete final load shedding evaluations on each of the four battery distribution systems.
3.3.1.A	The licensee has not determined the exact capacity of new FLEX equipment and thus does not know if it is capable of supplying one or two units. This information is required to determine if two or three of a particular item are required to meet the N+1 criteria of NEI 12-06.
3.4.A	Offsite Resources - Confirm NEI 12-06 Section 12.2 Guidelines 2 through 10 are covered in the arrangements with SAFER for offsite resources.

The following Confirmatory Items remained under review following the onsite FLEX Audit conducted June 8-12, 2015. During the audit, calculations and information were provided to the NRC staff. After the conclusion of the onsite audit, the NRC staff completed their reviews and posed no additional questions. This was noted in Point Beach's Audit Report dated August 27, 2015 [ML15208A027].

Confirmatory Item	Description
3.2.1.5.A	The licensee needs to complete the GOTHIC® analysis to determine the containment conditions expected during an ELAP event with low leakage RCP seals.
3.2.2.A	The licensee needs to complete analysis to demonstrate the adequacy of the PAB environment for equipment and personnel access with the SFP boiling.
3.2.4.2.A	The Integrated Plan does not address heat up under worst case conditions. The licensee needs to confirm temperatures in vital areas will be maintained below the design temperatures for installed and portable equipment relied upon in an ELAP/LUHS scenario, or alternatively, qualify electrical components for more severe temperatures.
3.2.4.6.A	Confirm the revision or development of procedures regarding temporary ventilation for vital areas to address habitability and accessibility under ELAP conditions.
3.2.4.6.B	Confirm the development of FSGs to provide guidance to evaluate work area conditions and long term habitability, which specify actions required to address elevated temperatures and extreme cold air temperatures.

Confirmatory Item 3.2.1.9.B was completed following the onsite FLEX Audit conducted June 8-12, 2015. Calculation 2013-12974, Charging Flow Path Hydraulic Evaluation, Revision 0, was made available to NRC staff. This calculation verifies that the final design of the portable diesel driven charging pump to be used for RCS boron addition and makeup meets the FLEX performance criteria. No additional questions have been posed for this item.

Confirmatory Item	Description
3.2.1.9.B	The licensee should verify that the final design of the portable diesel-driven charging pump to be used for RCS boron addition and makeup meets the performance criteria (flow rate, pressure, elevation) and that it is compatible with other FLEX equipment (hoses, fittings, etc.).

ATTACHMENT 4

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

FLEX AUDIT OPEN ITEM CLOSURE SUMMARY

FLEX AUDIT OPEN ITEM CLOSURE SUMMARY

The following are the remaining open or pending items from the FLEX Audit that was conducted onsite at Point Beach the week of June 8 – 12, 2015 as documented in Audit Report ML15208A027 dated August 27, 2015:

Audit Item Reference	Subject	NRC Request	Required Action	Response
ISE CI 3.2.1.9.B	RCS Boron Addition	The staff requested that the licensee make available for review the revised calculation associated with the portable skid charging pump after pump testing has been completed.	Provide revised calculation 2013-12974 to NRC for review.	Calculation 2013-12974, Charging Flow Path Hydraulic Evaluation, verifies that the final design of the portable diesel driven charging pump to be used for RCS boron addition and makeup meets the FLEX performance criteria (flow rate, pressure, and elevation). This calculation is complete and has been made available to the NRC staff.
35-B	Battery Room Ventilation	The licensee performed a calculation to determine the effects of ventilation loss on the battery room. During its review of the calculation, the staff noted that the calculation assumed that doors will be opened to assist with ventilation. However, the procedures that will be used to mitigate ventilation loss during an ELAP event did not mention opening doors. The NRC staff discussed this inconsistency with the licensee and was entered into the licensee's corrective action program.	Provide revised calculation to NRC for review.	The Point Beach FLEX strategy for addressing HVAC and habitability concerns is to monitor the rooms, open doors as temperatures increase, and establish forced ventilation if required. Calculations were reviewed to determine if and when action would be required. Existing calculations were used if they bounded the ELAP conditions and provided conservative time estimates for necessary actions. For the ELAP event, heat sources are minimal because of the loss of all AC and the FLEX strategy which removes all unnecessary DC loads within 2 hours of the event to maximize battery life. All HVAC is assumed to be functioning normally initially and room and area temperatures are within normal control band prior to the event. Opening doors to allow rooms to communicate with open areas in the same building provides an initial benefit. Opening doors to the outside or hot areas like the turbine hall would be delayed until it provides a cooling benefit. The primary calculations used for this evaluation are: 1. Calculation 2005-0054, Control Building GOTHIC Temperature Calculation, Revision 6 2. GOTHIC Calculation 2013-0020, PAB Scenarios for Fukushima Coping, Revision 1

				Required actions and guidance have been incorporated into the appropriate FLEX Support Guidelines (FSG-4 and FSG-5). The calculations and white paper (PB HVAC Summary During an Extended Loss of AC Power, Revision 1) have been made available to the NRC staff.
63-B	Steam Generator FLEX Pump	The staff requested that the licensee make available for review the completed calculation associated with the FLEX SG pump.	Provide completed calculation 2015-04238 to NRC for review.	Calculation 2015-04238, Hydraulic Analysis of Flow Path With the Supply of Lake Water to the SG via the AFW System During a FLEX Scenario, Revision 0, is complete and has been made available to the NRC staff. In addition, Calculation 2013-08213, Hydraulic Analysis of Flow Path for Residual Heat Removal Mode 5 and 6 During a FLEX Scenario, Revision 1, is complete and has been made available to the NRC staff.
84-B	Uncontrolled Cooldown	The NRC staff requested that the licensee clarify whether consequential damage to an ADV or upstream associated piping directly resulting from the ELAP initiating event (e.g., tornado, earthquake) could result in an uncontrolled cooldown of the RCS. The licensee provided calculations for a main steam line break (MSLB) that were performed during Point Beach's power uprate review, however, no calculations were performed for RCS subcooling, subcriticality conditions concurrent with SG blowdown during ELAP conditions. Although the size of the MSLB bounds a sheared or damaged ADV, the available mitigating systems are reduced under ELAP conditions (e.g., safety injection (SI) unavailable). Therefore, it's unclear if the	Conduct an analysis of RCS conditions during/following uncontrolled cooldown during an ELAP scenario, and make the analysis available to the NRC Staff.	The major concerns associated with a tornado missile causing an uncontrolled RCS cooldown during an ELAP event are the RCS temperature response (including any impact on RCP Shutdown Seal (SDS) actuation), the ability to maintain sub-criticality, and the RCS level impact. To address the issue, the amount of damage caused by a tornado missile striking the Main Steam (MS) components between containment and the MS Isolation Valve (MSIV) was determined. This included determining if a missile strike impacting both MS line headers is credible. Calculation 2015-07502, Evaluation of Atmospheric Dump Valves, Main Steam Relief Valves and AFW Steam Supply Line for Tornado Missile Effects, Revision 0, was performed assuming a Point Beach design basis missile on each of the components. The MS components are approximately 60 feet above the surrounding grade so the applicable design basis missile is a 4 in. x 12 in. x 12 ft. 108 lb. plank traveling at 300 mph. The results of the analysis indicated damage to each of the components and loss of pressure boundary. The bounding case was shearing/breaking of the 6 in. diameter branch connection to the ADV, which is also the same size as the MSSV branch connections. All other branch connections are smaller. The safety valve and dump valve header is considered to be part of the main steam line; same diameter and thickness. The 6 in. diameter branch connection is considered as the bounding break size.

		existing MSLB analysis bounds the ADV damage analysis during an ELAP.		Penetration of the MS line was determined to not be a concern and loading applied to the steam line was judged to not be an issue based on line size, thickness, short spans, and supports. SL-012991, Tornado Missile Strike Probability for Atmospheric Dump Valves, Main Steam Relief Valves, and AFW Steam Supply Lines to Steam Driven Turbine, Revision 0, concluded that the probability of a missile that would cause significant damage striking both MS line components is so low it is not considered credible. This is based on strike probability, height above grade, typical missiles, typical tornado paths and shielding by intervening structures. Thus, it is reasonable to assume that at least one set of ADVs, MSSVs and the Steam Supply line for the AFW pump will be available during an ELAP event following a high wind event. Based on the above analysis, it was concluded that damage to both steam line header components resulting in blowdown of both SGs was not credible and would not be included as a BDB/ELAP evaluated event. Damage resulting from the deterministic design basis bounding tornado missile could cause damage resulting in loss of function, inadvertent operation and loss of pressure boundary. Based on this, an analysis was performed to determine the impact of an uncontrolled cooldown caused by a steam line break or inadvertent operation of a MS component on a single train during a BDB/ELAP event. Westinghouse analysis, CN-TA-15-31, Point Beach Uncontrolled Asymmetric Cooldown During ELAP Analysis, Revision 0, provides the Nuclear Steam Supply System (NSSS) response to an uncontrolled RCS cooldown due to missile damage to a single SG and subsequent cooldown during an ELAP event initiating from Mode 1. The analysis determined the effects on key parameters such as core decay heat levels, core life (reactivity feedback) and shutdown margin. The analysis addressed the following questions:

				• How will the uncontrolled cooldown impact RCS temperatures, and will the SHIELD RCP seals actuate? • Will sufficient shutdown margin be available during uncontrolled cooldown to maintain core sub-criticality? • How will the uncontrolled cooldown impact RCS inventory, and will the core remain covered? • How will the uncontrolled cooldown impact RCS pressure, and will the accumulators inject? The RETRAN code was used to perform this analysis. The analysis considered two steam leak sizes, a stuck open MSSV and a sheared off MSSV/ADV, which provides a realistic and bounding analysis for the possible damage. It evaluated two different operator response times for isolating feed flow to the faulted SG, 10 minutes and 20 minutes. The 20 minute time was initially assumed because the existing EOP (ECA-0.0, Loss of All AC Power) did not provide guidance for isolating feed flow to a faulted SG. ECA-0.0 has been revised to include a step in the foldout page to address a faulted SG. Having the step in the foldout page allows the reactor operator to take action as soon as a faulted condition is recognized. Based on time validation performed, operators are checking AFW flow at 2 to 3 minutes into the event and would recognize the faulted condition. Thus, 10 minutes for isolating feed flow to the faulted SG, which can be done remotely from the control room, was considered a reasonable time for the analysis. Results from the analysis show that: • RCS temperature drops to around 300 F (worst case) and then recovers • For all cases, except the worst case, RCS cold leg temperature remains above SDS actuation design temperature range of 260 F to 320 F and all cases remain above the nominal actuation temperature of approximately 282 F (FSE-14-1-P, Revision 1). For the worst case, if SDS actuation does not occur prior to reaching minimum cold leg temperature, it would occur after temperature recovers in both loops.

				• There is no return to power; worst case was a 24 second loss of shutdown margin • Voiding in the upper head may occur but core uncover does not occur • Accumulators may inject but do not empty, no nitrogen injection • Worst case RCS pressure recovery does result in a pressurizer safety valve lift, however, this does not occur for either of the 10 minute AFW flow isolation cases • The pressurizer/RCS does not go solid for any of the cases • Natural circulation in the non-faulted loop is reestablished Based on the analysis performed, the Point Beach FLEX strategies can be effectively implemented during a BDB/ELAP event with coincident tornado missile damage resulting in an uncontrolled cooldown. Procedure changes were made to allow operators to expeditiously take action to reduce the impact of the uncontrolled cooldown event. The evaluations and analysis have been made available to the NRC staff for review.

ATTACHMENT 5

NEXTERA ENERGY POINT BEACH, LLC

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

FINAL INTEGRATED PLAN IN RESPONSE TO ORDER EA-12-049

(79 pages follow)

FLEX FINAL INTEGRATED PLAN

U.S. NUCLEAR REGULATORY COMMISSION
ORDER EA-12-049
STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS

POINT BEACH NUCLEAR PLANT
UNITS 1 AND 2

EVALUATION 2015-0030
REVISION 0

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1. Introduction

In 2011, an earthquake-induced tsunami caused Beyond-Design-Basis (BDB) flooding at the Fukushima Dai-ichi Nuclear Power Station in Japan. The flooding caused the emergency power supplies and electrical distribution systems to be inoperable, resulting in an extended loss of alternating current (AC) power (ELAP) in five of the six units on the site. The ELAP led to (1) the loss of core cooling, (2) loss of spent fuel pool cooling capabilities, and (3) a significant challenge to maintaining containment integrity. All direct current (DC) power was lost early in the event on Units 1 & 2 and after some period of time at the other units. Core damage occurred in three of the units along with a loss of containment integrity resulting in a release of radioactive material to the surrounding environment.

The US Nuclear Regulatory Commission (NRC) assembled a Near-Term Task Force (NTTF) to advise the Commission on actions the US nuclear industry should take to preclude core damage and a release of radioactive material after a natural disaster such as that seen at Fukushima. The NTTF report [5.4] contained many recommendations to fulfill this charter, including assessing extreme external event hazards and strengthening station capabilities for responding to beyond-design-basis external events (BDBEEs).

2. Regulatory Evaluation

2.1. Order EA-12-049

Based on NTTF Recommendation 4.2, the NRC issued Order EA-12-049 [5.5] on March 12, 2012 to implement mitigation strategies for BDBEEs. The order provided the following requirements for strategies to mitigate BDBEEs:

1. Licensees shall develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and SFP cooling capabilities following a BDBEE.

2. These strategies must be capable of mitigating a simultaneous loss of all AC power and loss of normal access to the ultimate heat sink and have adequate capacity to address challenges to core cooling, containment and SFP cooling capabilities at all units on a site subject to the Order.

3. Licensees must provide reasonable protection for the associated equipment from external events. Such protection must demonstrate that there is adequate capacity

to address challenges to core cooling, containment, and SFP cooling capabilities at all units on a site subject to the Order.

4. Licensees must be capable of implementing the strategies in all modes.

5. Full compliance shall include procedures, guidance, training, and acquisition, staging or installing of equipment needed for the strategies.

NRC Order EA-12-049 [5.5] required licensees of operating reactors to submit an overall integrated plan, including a description of how compliance with these requirements would be achieved by February 28, 2013. The Order also required licensees to complete implementation of the requirements no later than two refueling cycles after submittal of the overall integrated plan or December 31, 2016, whichever comes first. NEI 12-06 [5.9] provided guidance for compliance with Order EA-12-049 [5.5]. The NRC determined that, with the exceptions and clarifications provided in JLD-ISG-2012-01 [5.7], conformance with the guidance in NEI 12-06 is an acceptable method for satisfying the requirements in Order EA-12-049 [5.5].

2.2. Order EA-12-051

NRC Order EA-12-051 [5.6] required licensees to install reliable SFP instrumentation with specific design features for monitoring SFP water level. This order was prompted by NTTF Recommendation 7.1.

NEI 12-02 [5.8] provided guidance for compliance with Order EA-12-051[5.6]. The NRC determined that, with the exceptions and clarifications provided in JLD-ISG-2012-03 [5.70], conformance with the guidance in NEI 12-02 is an acceptable method for satisfying the requirements in Order EA-12-051[5.6]. PBNP compliance with NRC Order EA-12-051 has been completed [5.84].

3. Technical Evaluation of Order EA-12-049

3.1. Overall Mitigation Strategy (Three Phases)

The objective of the FLEX Strategies is to establish an indefinite coping capability in order to 1) prevent damage to the fuel in the reactors, 2) maintain the containment function and 3) maintain cooling and prevent damage to fuel in the spent fuel pool (SFP) using installed equipment, on-site portable equipment, and pre-staged off-site resources. This indefinite coping capability will address an extended loss of all AC power (ELAP) – loss of off-site power, emergency diesel generators and any alternate AC source, but not the loss of AC power to buses fed by station batteries through inverters – with a simultaneous loss of access to the ultimate heat sink (LUHS). This condition could arise following external events that are within the existing design basis with additional failures and conditions that could arise from a BDBEE.

The plant indefinite coping capability is attained through the implementation of pre-determined strategies (FLEX strategies) that are focused on maintaining or restoring key plant safety functions. The FLEX strategies are not tied to any specific damage state or mechanistic assessment of external events. Rather, the strategies are developed to maintain the key plant safety functions based on the evaluation of plant response to the coincident ELAP/LUHS event. A safety function-based approach provides consistency with, and allows coordination with, existing plant emergency operating procedures (EOPs). FLEX strategies are implemented in support of EOPs using FLEX Support Guidelines (FSGs).

The strategies for coping with the plant conditions that result from an ELAP/LUHS event involve a three-phase approach:

- Phase 1 – Initially cope by relying on installed plant equipment and on-site resources.
- Phase 2 – Transition from installed plant equipment to on-site portable FLEX equipment.
- Phase 3 – Obtain additional capability and redundancy from off-site equipment and resources until power, water, and coolant injection systems are restored.

The duration of each phase is specific to the installed and portable equipment utilized for the particular FLEX strategy employed to mitigate the plant condition. A timeline and validation plan for the implementation of the FLEX strategies is included Attachment A. PBNP has performed a Phase I and II staffing assessment [5.85] [5.86]. Minimum ERO on shift staffing levels are assumed to be available for the first 6 hours of the event. A portion of the minimum non-ERO personnel (Security) are assumed to be available for debris removal and retrieval of FLEX equipment. Offsite resources (personnel, equipment, etc.) will begin at hour 6 and full staffing is expected by 24 hours into the event.

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The strategies described below are capable of mitigating an ELAP/LHUS resulting from a BDBEE by providing adequate capability to maintain core cooling, containment and SFP cooling capabilities for both units of the Point Beach Nuclear Plant (PBNP). Though specific strategies have been 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, are initiated by the PBNP emergency operating procedures.

3.2. Reactor Core Cooling Strategy and RCS Makeup

The FLEX strategy for reactor core cooling and decay heat removal is to release steam from the Steam Generators (SGs) using the Atmospheric Dump Valves (ADVs) or Main Steam Safety Valves (MSSVs) and the addition of a corresponding amount of feedwater to the SGs via the turbine driven Auxiliary Feedwater (TDAFW) pump or alternately with a portable diesel driven FLEX SG Pump (PDSG) and connected hoses and fittings. The AFW system utilizes the Condensate Storage Tanks (CSTs) as the initial water supply to the TDAFW pump. The Diesel Driven Fire Pump (DDFP) can also be used to provide a suction source via the Service Water (SW) system to the TDAFW pump and feed the SGs. RCS makeup is required to account for RCS system leakage and density changes as a result in the reduction in RCs temperature.

DC bus load shedding will ensure battery life is extended to 10 hours [5.16]. A portable diesel generator (PDG) will repower battery chargers prior to battery depletion to ensure continued availability of the essential instrumentation.

3.2.1. Core Cooling Strategy

3.2.1.1. Phase 1 Strategy

Immediately following the loss of power, the reactor will trip and the plant will initially stabilize at no-load reactor coolant system (RCS) temperature and pressure conditions, with reactor decay heat removal via steam release to the atmosphere through the MSSVs and/or SG ADVs. Natural circulation of the reactor coolant system will develop to provide core cooling and the TDAFW pump will provide flow from the CSTs to the SGs to make-up for steam release.

Operators will respond to the event in accordance with emergency operating procedures (EOPs) to confirm reactor coolant system, secondary system, and containment conditions. A transition to ECA-0.0 Unit 1(2), Loss of All AC Power, [5.71] or SEP 3.0 Unit 1(2), Loss of All AC Power While On Shutdown Cooling [5.11] will be made upon the diagnosis of the total loss of AC power. ECA-0.0 directs isolation of reactor coolant system letdown pathways, confirmation of natural circulation cooling, verification of containment isolation, reducing DC loads on the station Class 1E batteries, and establishment of electrical equipment alignment in preparation for eventual power restoration. The operators re-align auxiliary feedwater flow to all SGs, establish manual control of the SG ADVs, and stabilize the plant. ECA-0.0 Unit 1(2) directs local manual control of auxiliary feedwater flow to the SGs and manual control of the SG ADVs to control steam release to control the RCS cooldown rate, as necessary. Entry into the FSGs is made when conditions to restore AC power are not present.

The main active component associated with this strategy is the TDAFW pump, which is automatically actuated to provide feedwater from the CSTs to the SGs for the removal of reactor core decay heat. This automatic action is verified in procedure ECA-0.0 Unit 1(2). The TDAFW pump turbine exhaust line is not fully protected against tornado missiles. Tornado missile protection for the AFW system is based on separation and redundancy [5.1]. The exhaust piping has been modified to cross connect the steam exhaust of each unit's TDAFW pump turbines so that a single missile does not render the TDAFW pumps inoperable. The steam exhaust cross connect is a passive design, where the cross connect valve is open unless isolated for maintenance. Separation and redundancy criteria for tornado missiles also applies to the routing of the TDAFW steam supply lines and the SG ADVs. Cross connect piping between the Unit 1 and Unit 2 TDAFW pump steam supply lines and cross connect piping between the Unit 1 and Unit 2 TDAFW pump discharge lines were installed to improve system redundancy and the capability to handle multiple failures. Procedure FSG-15 Unit 1(2), AFW Cross Tie, provides the steps to align the TDAFW pump discharge and steam supply cross connects. The time required to align the steam supply or pump discharge cross connections is not considered as a time constraint because multiple failures are not assumed at time zero per NEI 12-06 [5.9] however, PBNP has validated the time required to cross connect the steam supplies to the TDAFW pump.

Initially, the TDAFW pump will take suction from the CSTs. The CSTs, located in the Turbine Building (TB), have a usable volume of 45,000 gallons and have a Technical Specification required volume of 21,150 useable gallons per Unit. Both CSTs have been modified to provide seismic qualification and tornado missile protection to a tank level of 6 feet above the TDAFW pump suction nozzle. This height will provide a volume of 14,100 gallons of available water per tank [5.10]. Per WCAP 17601-P [5.63], SG heat removal capability remains available as long as the level in the SG is approximately 5 feet or greater. Based on decay heat removal requirements, 1 hour 53 minutes of core cooling are available utilizing the CST volume and the SG volume above the 5 foot level [5.72]. During this period, the DDFP will be aligned to the SW system by closing motor operated valve FP-448 and opening motor operated valve FP-536 from their control switches in the Vital Switchgear (VSG) Room per FSG-2, Alternate AFW Suction Source. Portions of the SW system will also be isolated per the FSG to prevent flow diversion from leaking SW header valves or failed non-seismic portions of the SW system as required. A hydraulic analysis of the DDFP as the suction source for the TDAFW pump has been completed [5.89].The time required to perform these actions was validated to be less than 1 hour 53 minutes. If the alignment process is not completed in time, the TDAFW pump is protected from damage by an automatic trip on low pump suction pressure and/or low CST level. However, the time margin available and the ability to control TDAFW pump flow will allow the operator to maintain TDAFW pump in operation. To credit the use of the DDFP, the DDFP was replaced. Both, the new DDFP and the associated FP piping were seismically qualified for the BDBEE per EC 259770.

RCS makeup is not required for Phase 1. The Reactor Coolant Pump (RCP) seals were upgraded with low leakage RCP seals qualified for the service conditions for 7 days per EC 277545. Since the low leakage seals will allow negligible RCS inventory losses through the RCP seals, RCS makeup is no longer required to achieve a stable steady state in Phase 1 with the reactor core being cooled. Cooldown of the RCS will commence approximately 12 hours after the BDBEE.

If SGs are unavailable in MODES 5 and 6 and the refueling cavity is not flooded, the RCS will heat up and boil. Makeup flow to the RCS will be established via gravity drain from the Refueling Water Storage Tank (RWST) (if RCS is vented to atmosphere) or from the Safety Injection (SI) accumulator(s) via the fill line per SEP 3.0 [5.11] or FSG-14, Shutdown RCS Makeup. The SI accumulator fill line is connected to the SI cold leg injection line and when aligned will provide make up directly to the reactor vessel as shown in Figure 3.2.1. The flow required to remove the decay heat load is approximately 60 gpm [5.12] which provides at least 2 hours of decay heat removal based on Technical Specification (TS) accumulator volume requirements of 1,100 to 1,136 cubic feet [5.3]. A hydraulic analysis of the flow path was performed per Calculation 2013-13938 [5.13].

In MODE 6, with the cavity flooded, the time to boil is in excess of 7 hours [5.14]. With the cavity at the required refueling height of greater than 23 feet above the reactor vessel flange [5.2] and a volume of 12,000 gallons per foot [5.15], it will take greater than 72 hours to boil the cavity dry. Because of the significant time available, a Phase 2 makeup strategy is not required for this condition.

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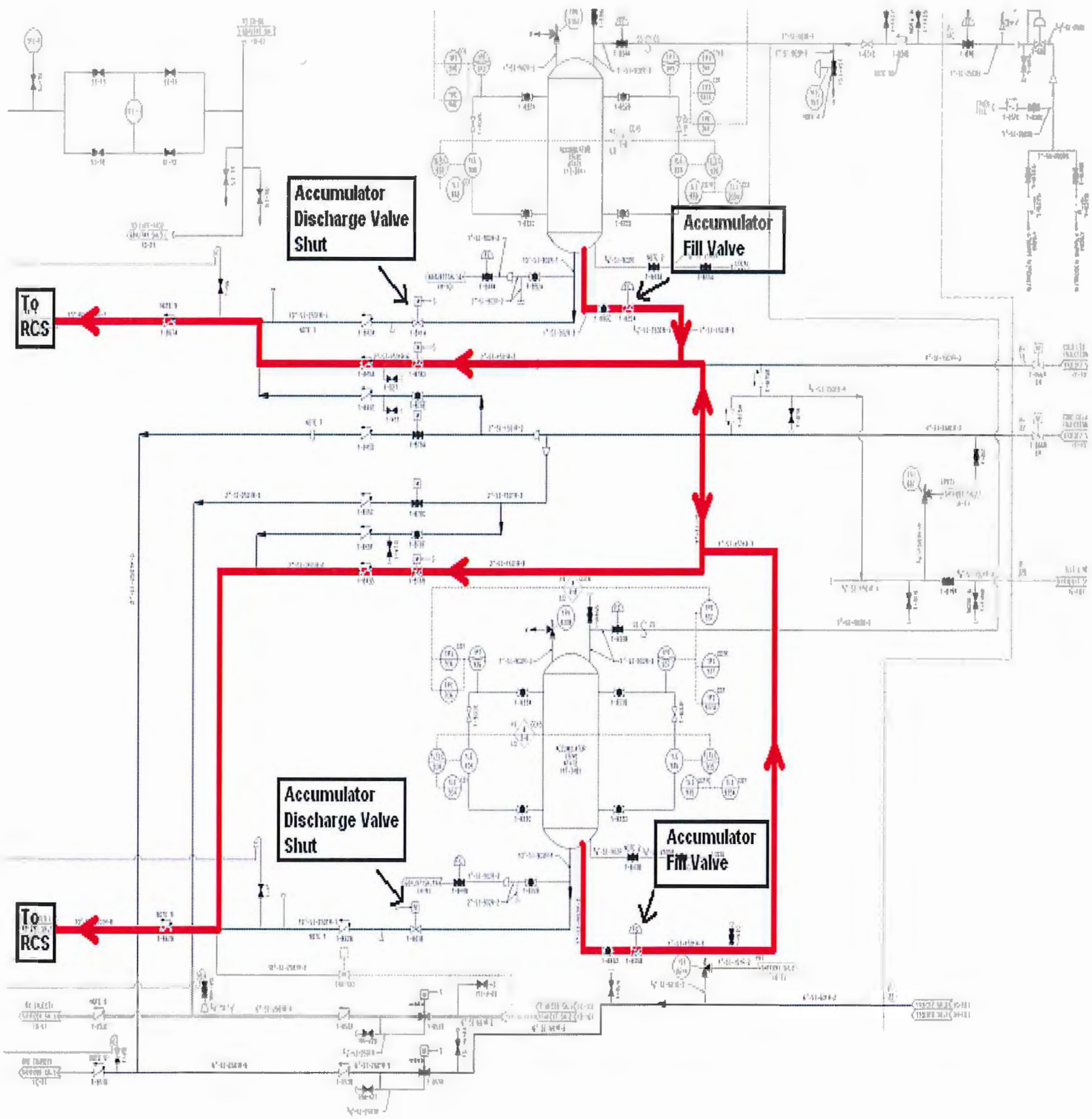

Figure 3.2.1
RCS Makeup Via SI Accumulator

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3.2.1.2. Phase 2 Strategy

Several actions for reactor core cooling are required during Phase 2 following the event. The main strategy is dependent upon the continual operation of the TDAFW pumps which are only capable of feeding the SGs as long as there is sufficient steam pressure to drive the TDAFW pump turbines. Proper operation of the TDAFW pump at low SG steam pressures has been evaluated [5.64].

The DDFP will continue to supply to the suction of the TDAFW pump via the SW system. The DDFP takes suction from the SW pump bay in the Circulating Water Pump House (CWPH), which is a Class I structure that meets seismic and missile protection criteria.

Phase 2 also requires a baseline capability for reactor core cooling to connect an onsite, portable pump (PDSG) for injection into the SGs in the event that a TDAFW pump fails or when sufficient steam pressure is no longer available to drive the turbine [5.9]. The PDSG pump will be positioned on the north side (primary) or south side (alternate) of the CWPH with suction hoses routed to draw water from the CWPH SW pump bay or forebay and deliver it to the SGs in both units by connecting to the Motor Driven Auxiliary Feedwater Pump 3 inch crosstie valve, AF-201 (Figure 3.2.2). Alternate suction and discharge connections include direct draft from Lake Michigan and the B.5.b connections at valves 1(2)CS-303/304 in the Main Feedwater piping respectively.

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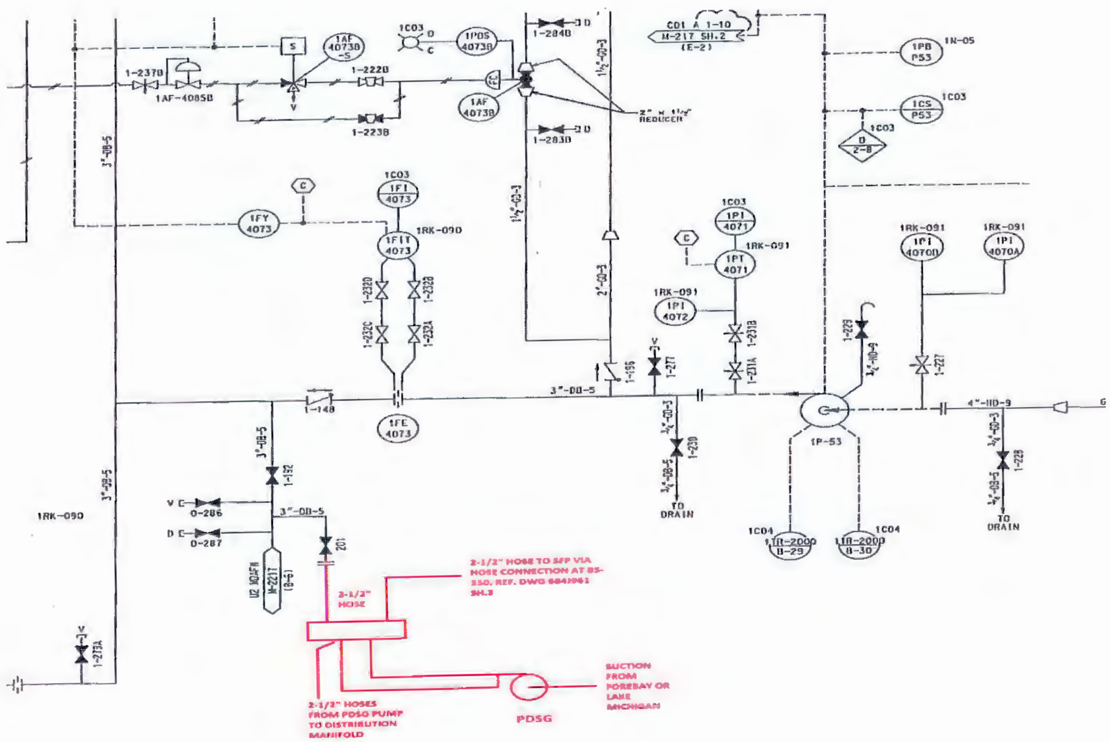

Figure 3.2.2
SG Injection from PDSG Pump
(Ref. Dwg M-217 Sh. 3)

RCS makeup and boron addition is accomplished via a portable diesel driven charging pump, PDCP. The PDCP will draw borated water from the RWST via drain valve 1(2)SI-D-1 or from the RWST or the Boric Acid Storage Tanks (BASTs) by replacing the bonnet on valve 1(2)SI-825C with a hose connection. The pump discharges to the RCS loop A or B via Chemical Volume and Control System (CVCS) charging pump discharge drain line valves 1(2)CV-262B/E as the primary and 1(2)CV-262C/F as the alternate connection as shown in Figure 3.2.3 for Unit 1. Operation of the pump is governed by FSG-8, Alternate RCS Boration and FSG-14, Shutdown RCS Makeup. The pumps are mounted on wheeled carts and permanently staged on the 8 ft. elevation of the Primary Auxiliary Building (PAB).

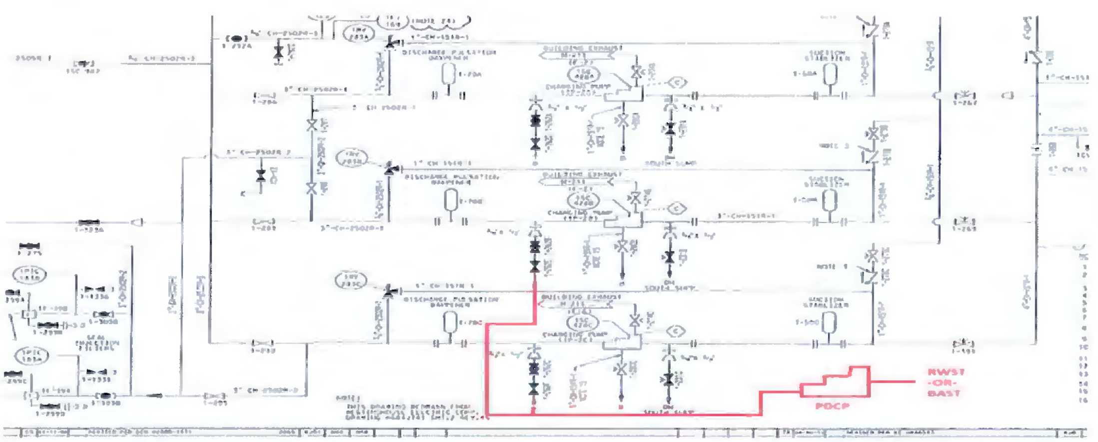

Figure 3.2.3
PDCP for RCS Makeup

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If SGs are unavailable in MODES 5 and 6 and the refueling cavity is not flooded, a portable diesel driven RCS makeup (PDMU) pump will draw borated water from the RWST at drain line 1(2)SI-D-1 or the BASTs / RWST by replacing the bonnet on valve 1(2)SI-825C with a hose connection. The pump discharge will be routed to the RCS using primary or secondary connection points on the Residual Heat Removal (RHR) system piping as shown on Figure 3.2.5. The primary connection points to the RHR system are at 1(2)RH-719. The alternate connections points are at the RHR Heat Exchanger Drains. Procedure FSG-14 will govern the use of these pumps. A flow rate of 60 GPM or less will be sufficient to remove decay heat [5.12]. Calculation 2013-08213 [5.17] performed the hydraulic analysis for this installation.

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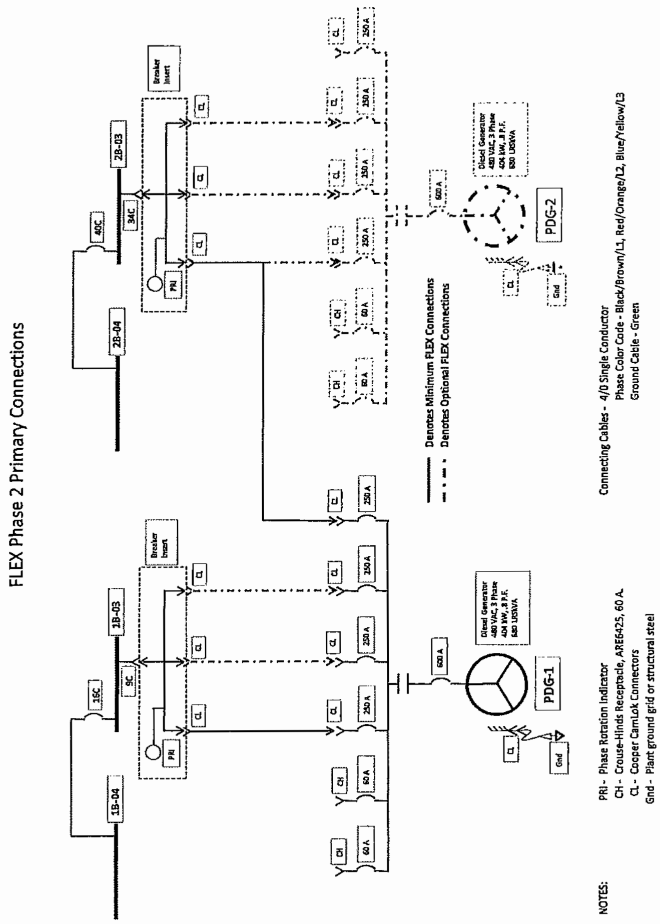

Figure 3.2.4
FLEX PDG Schematic

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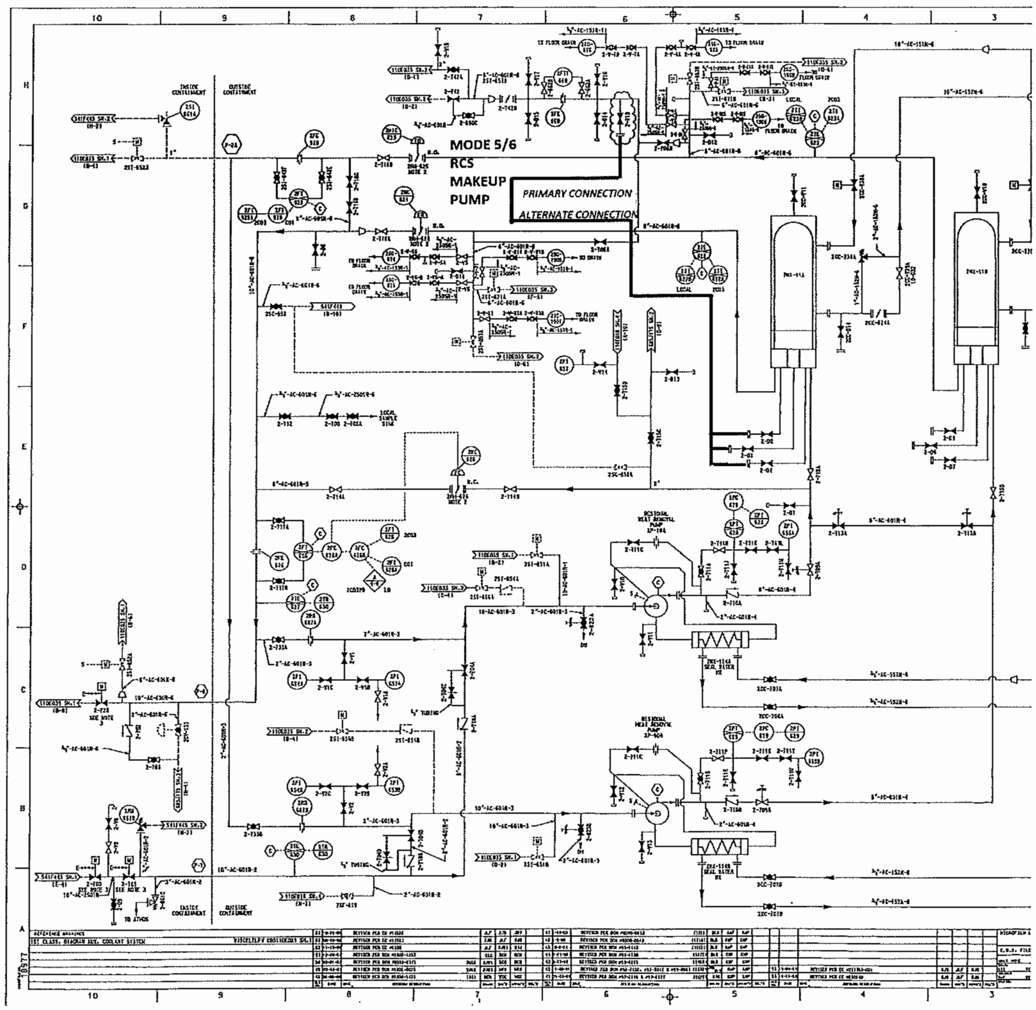

Figure 3.2.5
Mode 5/6 U2 RCS Injection from PDMU Pump
(Ref. Dwg 110E029 Sh. 1)

3.2.1.3. Phase 3 Strategy

Additional equipment from the National SAFER Response Center (NSRC) is scheduled to start arriving 24 hours after requested. Phase 3 strategies for all modes of RCS cooling will be to establish Shutdown Cooling (SDC) which will require a NSRC pumping system capable of cooling the Component Cooling Water (CCW) Heat Exchanger that in turn cools the Residual Heat Removal (RHR) Heat Exchanger. Two 1 megawatt (MW) diesel generators supplied from the NSRC will provide 4.16 kVAC power to Safeguards Busses, CCW Pumps and RHR pumps. The offsite pumping system will provide a minimum of 5,000 gpm of cooling water flow. The pump will obtain suction from Lake Michigan via direct draft, CWPH SW pump bay or the CWPH forebay. The pump discharge will be directed to the SW system by replacing three of the SW Pump discharge check valve covers with hose connection fittings.

The NSRC 4.16 kVAC generator will re-power several loads in support of SDC. One RHR pump will be re-powered to establish RCS recirculation. Heat removal will be through the RHR heat exchangers which are cooled by establishing flow through the CCW system by repowering the CCW pumps. Temporary power cables will be supplied with the NSRC 4.16 kVAC generators for connecting to the Class 1E 4.16 kVAC buses through switchgear located in G03/G04 Diesel Generator Building.

3.2.2. Reactor Core Cooling Strategies Evaluation

3.2.2.1. Systems, Structures and Components (SSCs) Availability

3.2.2.1.1. Permanent Plant SSCs

- Turbine Driven Auxiliary Feedwater (TDAFW) Pump
  The TDAFW pump will automatically start and will deliver AFW flow to the SGs following an ELAP / LUHS event. Redundant steam supplies, each with a single motor operated valve, supply steam to the TDAFW pump turbine. The MOV is DC powered and normally closed. In the event the TDAFW pump fails to start,

procedure, FSG-2, Alternate AFW Suction Source, directs the operators to manually reset and start the pump (which does not require AC electrical power for motive force or control). The TDAFW pump is sized to provide more than the design basis AFW flow requirements and is located in the Control Building, a safety related structure designed for protection for applicable design basis external events. The TDAFW pump and its associated components are located above the 9 foot elevation therefore, they are protected from external flooding [5.47].

- Steam Generator Atmospheric Dump Valves (ADVs)
  During an ELAP / LUHS event with the loss of all AC power and instrument air, reactor core cooling and decay heat will be removed from the SGs for an indefinite time period by manually opening / throttling the SG ADVs or operation of the MSSVs. The SG ADVs are physically separated and partially protected by the containment structure. Thus, a single missile will not adversely impact the operation of both ADVs simultaneously. This is supported by the FSAR and a separate evaluation regarding tornado missile strike probability with respect to the SG ADV, MSSVs and AF steam supply piping in the facades [5.77]. Calculation 2015-07502 [5.76] was performed assuming a PBNP design basis missile impact on the Main Steam (MS) components between containment and the MS Isolation Valves (MSIVs). The MS components are approximately 60 feet above the surrounding grade so the applicable design basis missile is a 4"x12"x 12', 108 lb. plank traveling at 300 mph. The results of the analysis indicated damage to each of the components and loss of pressure boundary. The bounding case was shearing/breaking of the 6 inch branch connection to the ADVs which is also the same size as the MSSVs branch connections. The 30" diameter MS header was determined not to be adversely affected by the missile.

  The uncontrolled RCS cooldown due to missile damage to a single SG ADV and subsequent cooldown during an ELAP event initiating from Mode 1 has been evaluated [5.78]. The analysis considered two steam leak sizes, a stuck open MSSV and a

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sheared off MSSV/ADV, which provides a realistic and bounding analysis for the possible damage. It evaluated two different operator response times for isolating feed flow to the faulted SG, 10 minutes and 20 minutes. Base on time validation performed, operators are checking AFW flow at 2 to 3 minutes into the event and would recognize the faulted condition. Thus, 10 minutes for isolating feed flow to the faulted SG which can be done remotely from the control room was considered a reasonable time for the analysis.

Results from the analysis show that:

- RCS temperature drops to nearly 300° F (worst case) and then recovers.
- For all except the worst case, RCS cold leg temperature remains above SDS actuation design temperature range of 260 F to 320 F and all remain above the nominal actuation temperature of approximately 282 F.
- There is no return to power. Worst case was a 24 second loss of shutdown margin.
- Voiding in the upper head may occur but core uncover does not occur.
- Accumulators may inject but do not empty, no nitrogen injection.
- Worst case RCS pressure recovery does result in a pressurizer safety valve lift however this does not occur for either of the 10 minute AFW flow isolation cases.
- The pressurizer/RCS does not go solid for any of the cases.
- Natural circulation in the non-faulted loop is reestablished.

- Batteries
  The safety related batteries and associated DC distribution systems are located within the safety related PAB and Control Building which are designed to meet applicable design basis external hazards and will be used to initially power required essential instrumentation, and applicable DC control components. Load shedding of non-essential equipment and battery realignment provides a minimum total service time of 10 hours.

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- Condensate Storage Tanks (CSTs)
  The condensate storage tanks (CSTs) provide a water source at the initial onset of the event for the core cooling and heat removal strategy. The tanks are seismically designed and tornado missile protected to 6 feet above the TDAFW pump suction connection per EC 279034. Therefore, the CST usable volume is at least 14,100 gallons per unit for emergency makeup to the SGs for both units. This volume will ensure that 1 hour 53 minutes of decay heat removal time is available to allow switchover to the alternate suction source, FP via the SW system, prior to the SGs reaching a level of 5 feet.

- Diesel Driven Fire Pump (DDFP) Supply and Suction
  The DDFP and associated piping are seismically designed. It starts automatically on a loss of AC and can also be started from the Control Room. The DDFP takes suction from the SW pump bay in CWPH. The CWPH is a robust structure that meets seismic and missile protection criteria. The CWPH forebay design provides four connection paths to Lake Michigan, two intake pipes and two discharge flumes. Any one of the paths is capable of supplying a quantity of water well in excess of the amount required for decay heat removal. Normal water supply from Lake Michigan, the Ultimate Heat Sink (UHS), is via an intake crib located approximately 1/4 mile out in the lake. If the normal supply from the UHS is lost, flow will be established through the discharge flumes to the pump bay [5.18]. Sufficient water is available within the pump bay to supply the DDFP while manual actions are taken to establish the alternate connection to the UHS. 440,826 gallons are available in the forebay pump bays [5.19]. Per WCAP-17601-P [5.63], the volume of water required to be injected into the secondary side of the SGs for a 24 hour coping time with cool down on a 3723 MWt plant is 318,525 gallons. Thus, the forebay volume provides greater than 24 hours of decay heat makeup for both of the PBNP two loop plants. Considering the volume available in the SW pump bay only, more than 11 hours of DDFP operation is available [5.79]. The DDFP is

supplied from a 400 gallon diesel fuel oil day tank (295 useable gallons) which provides an operating duration of 22 hours prior to refueling [5.20].

- AFW Discharge Connection
  The primary discharge connection for the PDSG is located on the Motor Driven Auxiliary Feedwater (MDAFW) Pump cross connect line on the PAB 8 foot elevation. A 10 foot long hose will be routed from the PDSG discharge manifold on the 8 foot elevation of the PAB to a hose adapter installed on the flange connection downstream of AF-201. This connection supports symmetric flow to both SGs in both units. Hydraulic analysis of the flow path has confirmed that applicable performance requirements are met [5.73]. The connection is seismically designed and protected from missiles by the PAB. The connection is located in an area, PAB 8 foot elevation, that is not susceptible to internal flooding since leakage from a failure of a non-seismic tank or pipe would collect in the -19 foot PAB sump [5.48]. External flooding for this location has also been evaluated and determined not to have any adverse effects [5.83].

- AFW Discharge Alternate Connection
  In the event that the primary discharge connection for the PDSG is not available, an alternate connection location is provided. The alternate discharge connection for SG injection is located at the B.5.b connections at valves 1(2)CS-303/304 which are accessed from the 8 foot elevation of the TB. This connection supports symmetric flow to both SGs. A flexible hose will be routed from the PDSG pump discharge to the alternate connection. Hydraulic evaluation for the AF-201 connection bounds this configuration due difference in pipe diameters between AF and CS supply to the SGs. The connections are located above the 9 foot plant elevation thus, they are accessible during an internal or external flood. The TB is considered seismically robust as described in Section 3.5.1.

- Charging Pump Discharge Connections

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The primary and alternate connections are downstream of valves 1(2)CV-262B/E and 1(2)CV-262C/F respectively. The connections are ½ inch Swagelok which will be transitioned to the 1 inch NPT discharge hose connection. The transition fitting will include a check valve and drain valve. Hydraulic analysis of the flow path has confirmed that a PDCP can provide 15 gpm of flow at 2000 psig which is sufficient capacity to overcome system head loss and the saturation pressure in the RCS [5.34]. The connections are located on CVCS piping that provides a closed loop outside containment therefore, these connections are seismically analyzed. The connections are also located on the 8 foot elevation of the PAB for missile protection. The connections are located in an area, PAB 8 foot elevation, that is not susceptible to internal flooding since leakage from a failure of a non-seismic tank or pipe would collect in the -19 foot PAB sump [5.48]. External flooding for this location has also been evaluated and determined not to have any adverse effects [5.83]. The discharge locations are isolable such that a failure of one of the connections does not disable the other connection and its ability to feed either RCS loop.

- SI Accumulator
  At least one accumulator is procedurally established and maintained available with a hot leg vent path established whenever possible per SEP 3.0 [5.11]. The Pressurizer PORVs may function as the vent path since they will serve as the LTOP protection with the RCS less than 285° F as required by TRM 2.2. Per Calculation P-89-012, the PORVs are equipped with a backup nitrogen supply that is sized to provide at least 86 valve cycles without being changed out for 15 hours. Therefore, the Pressurizer PORVs are capable of providing a vent path for an ELAP scenario. The accumulator fill valve, 1(2)SI-835A/B, is an air operated valve with a DC solenoid. Modifications installed a nitrogen supply from the SI Accumulator nitrogen fill line to serve as a backup if the Instrument Air supply is lost during an ELAP. 1(2)SI-835A/B is operated from the Control Room. A single SI accumulator is required to have a Technical

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Specification required volume between 1,100 and 1,136 cubic feet [5.3].

- Primary Electrical Connections

480V Connection
The primary connection for the FLEX 480V generator is at Safeguards Buses 1B-03 and 2B-03. These busses are located on the 26 foot elevation of the Cable Spreading Room inside the Control Building. Therefore, the connections are located in a seismic, missile protected structure. The elevation of the connection exceeds the elevation associated with external flood levels [5.47] and design features protect this area from internal flooding [5.48].

4160V Connection
The primary connection for the FLEX 4.16 kV generator supplied by the NSRC is at the 1(2)A-06, 4.16 kV switchgear located in the G-03/G04 Building. This is a Safety Related (SR), seismic structure which by definition provides missile protection for this connection. The G-03/G-04 Building is located at an elevation of 28 ft. with nearby topography sloping down to the 7 ft. elevation at the CWPH therefore; external flooding is not a concern [5.48].

- Alternate Electrical Connection

  480V Connection
  The alternate connection for the FLEX 480V generator is at Safeguards MCCs 1(2)B-32 and 1(2)B-42. These busses are located in the Cable Spreading Room inside the Control Building. Also, the secondary connections for the battery chargers are at MCCs 1(2)B-39 and 1(2)B-49 which are located in the Vital Switchgear Room which is part of the Control Building. Therefore, the connections are located in a seismic structure and are missile protected. The elevation of the connection exceeds the elevation associated with external flood levels [5.47] and design features protect this area from internal flooding [5.48].

3.2.2.1.2. Plant Instrumentation

Instrumentation providing the following key parameters is credited for all phases of the reactor core cooling and decay heat removal strategy:

- Turbine Driven Auxiliary Feedwater Flow
- SG Water Level
- SG Pressure
- RCS Hot Leg Temperature
- RCS Cold Leg Temperature
- Core Exit Thermocouples
- CST Level
- Pressurizer Level
- Reactor Vessel Level
- Neutron Flux
- RCS WR Pressure
- Containment Pressure
- Containment Temperature
- DC Bus Voltage
- SI Accumulator Pressure

At least one channel of the above essential instrumentation will be available prior to and after load stripping of the DC and AC buses during Phase 1. When practical, the capability exists to take field readings of important plant parameters using non-electrical gauges/indicators or with the installed instrument transmitters through the use of hand held meters (e.g. FLUKE 705 or 114). Procedure FSG-7, Loss of Vital Instrumentation or Control Power, provides location and termination information for all essential instrumentation. Availability of the essential instrumentation during Phases 2 and 3 will be continued as a result of re-energizing the battery chargers.

Portable FLEX equipment is supplied with installed local instrumentation as needed to operate the equipment. The use of these instruments is detailed in the associated FSGs or SOPs for use of the equipment.

3.2.2.2. Thermal-Hydraulic Analyses

3.2.2.2.1. Secondary Analysis

An analysis was performed to determine the available time to switch over to an alternate TDAFP suction source prior to depleting the CST protected inventory and maintain SG levels greater than 5 feet [5.72]. The conclusions from this analysis showed that approximately 1 hour, 53 minutes is available from the initiation of the event until the TDAFW pump suction source was required to be switched over to the SW/FP system. This is based on the missile protected CST usable volume of 14,100 gallons. Validation activities confirmed that within 1 hour 53 minutes, the TDAFW pump suction source can be transferred to DDFP discharge (via the SW system). The DDFP suction source is the SW pump bay of the CWPH.

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3.2.2.2.2. Reactor Coolant System Analysis

The PBNP strategy is to use both loops to cooldown the plant, provided both SGs are available. In the event only one SG is available for cooldown, the cooldown will be done using only one loop which is consistent with the current design and licensing basis response to station blackout [5.88].

PBNP is designed and licensed as a hot shutdown plant and PBNP relies on the MSSVs for decay heat removal and RCS temperature control. The plant could remain in a hot shutdown condition until the ADVs are repaired or an alternate steam release path can be established. PBNP has installed low leakage shutdown Reactor Coolant Pump (RCP) seals therefore, RCS inventory is not a concern for several days. Makeup water from Lake Michigan as feedwater to the SGs is considered an inexhaustible supply.

Additional analysis has been performed to determine if adequate boron mixing can be demonstrated during a single loop cooldown based on the calculated RCS conditions and loop flows during the periods of single phase and two phase cooling, prior to the initiation of reflux cooling. Boric acid injection using the reactor head vent path for letdown prior to commencing a cooldown will be performed unless both SG ADVs are available for a symmetrical cooldown. Westinghouse completed an analysis that modeled the ELAP scenario with an asymmetric cooldown [5.22]. The analysis demonstrated that this strategy is acceptable with no credit taken for boron mixing during asymmetric cooldown. After boron injection, a hold period of one hour with flow in both reactor coolant system loops equivalent to that associated with single phase natural circulation flow is allowed for complete boron mixing in the RCS prior to initiation of an asymmetric cooldown. PBNP is following the PWROG August 15, 2013, position paper on boron mixing [5.24] which was endorsed by the NRC on January 8, 2014 [5.23]. The assumptions contained in the conclusions of the Westinghouse position paper (LTR-FSE-13-46 Rev. 0 dated August 15, 2013) on boron mixing have been satisfied except for assumption 1 under certain conditions. The following describes how each of the assumptions is met:

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1. The PBNP strategy is to use both loops to cooldown the plant provided both steam generators are available. If for some reason only one SG is available for cooldown, the cooldown will be done using only one loop. For this condition, boric acid injection will be performed prior to commencing a cooldown.
2. A PDCP is used to inject boric acid into the RCS prior to and/or during cooldown to maintain Shutdown Margin. Connection locations have been identified for both the normal charging path and the auxiliary charging path. This allows injection into either RCS cold leg.
3. The PBNP strategy and timeline completes boron injection to achieve cold shutdown within the 100th hour after shutdown time frame.
4. The shutdown margin and boron injection requirements are based on the limiting condition of zero RCS leakage and uniform mixing throughout the entire RCS volume.
5. The SDM calculation did consider both the xenon transient (time after shutdown) and plant cooldown. The 1 hour requirement prior to the need time has been incorporated into FSG-8, Alternate RCS Boration.

The NRC has reviewed the information submitted to date and concluded that use of the industry approach dated August 15, 2013, entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG)," (ML13235A135) [5.24] is acceptable with clarifications listed in the letter [5.23]. PBNP has addressed the clarifications which are repeated below:

(1) The required timing for providing borated makeup to the primary system should consider conditions with no reactor coolant system leakage and with the highest applicable leakage rate for the reactor coolant pump seals and unidentified reactor coolant system leakage.

(2) For the condition associated with the highest applicable reactor coolant system leakage rate, two approaches have been identified, either of which is acceptable to the staff:

a. Adequate borated makeup should be provided such that the loop flow rate in two-phase natural circulation does not decrease below the loop flow rate corresponding to single-phase natural circulation.
b. If loop flow during two-phase natural circulation has decreased below the single-phase natural circulation flow rate, then the mixing of any borated primary makeup added to the reactor coolant system is not to be credited until one hour after the flow in all loops has been restored to a flow rate that is greater than or equal to the single-phase natural circulation flow rate.

In all cases, credit for increases in the reactor coolant system boron concentration should be delayed to account for the mixing of the borated primary makeup with the reactor coolant system inventory. Provided that the flow in all loops is greater than or equal to the corresponding single-phase natural circulation flow rate, the staff considers a mixing delay period of one hour following the addition of the targeted quantity of boric acid to the reactor coolant system to be appropriate.

3.2.2.3. Reactor Coolant Pump Seals

The RCP seals were upgraded with low leakage RCP seals qualified for the service conditions for 7 days. The new RCP seals are Westinghouse SHIELD® Passive Shutdown Seal, Generation III. RCP seal leakage rates are conservatively assumed to be 1 gpm per pump. Since the low leakage seals allow negligible RCS inventory losses through the RCP seals, RCS makeup is no longer required to achieve a stable steady state in Phase 1 with the reactor core being cooled. Cooldown of the RCS commences approximately 12 hours after the BDBEE. Delaying the RCS cooldown allows time for:

- Establishing the ability to isolate the SI Accumulators.
- Decay heat reduced to a level that can be removed by one SG ADV at reduced SG pressure.

- RCS cooldown to a SG temperature of 350°F would result in a SG pressure of 135 psia and which allows a single ADV to relieve enough steam to remove decay heat 6 hours after shutdown at this pressure [5.32].
- Deployment of the Phase 2 low capacity, high pressure Portable Diesel Driven Charging Pump (PDCP) and the establishment of RCS makeup/boric acid injection as required. Sufficient volume is available during a cooldown to inject water from the RWST and maintain the core sub-critical during cooldown without establishing letdown or venting the RCS to containment [5.22, 5.25, 5.28, 5.33].

Delaying RCS cooldown also benefits the TDAFW pump in that it minimizes the operational time during periods of reduced steam pressure.

3.2.2.4. Shutdown Margin Analyses

A shutdown margin (SDM) calculation has been performed to determine the required boron addition to maintain a SDM of 1% for various times after shutdown and various RCS temperatures [5.33]. It also evaluated the Xenon free condition. The results of this calculation were used in a second calculation [5.28] to develop the necessary requirements in FSG-8 (Alternate RCS Boration) to assure adequate SDM is established before the temperature or time after shutdown is exceeded.

Analyses were performed to adequately justify the boron mixing concern [5.22 and 5.25]. These analyses incorporated a delay period of one hour after boron injection was completed with flow in both reactor coolant system (RCS) loops equivalent to that associated with single phase natural circulation flow for complete boron mixing [5.23]. These analyses demonstrate that the current proposed diverse and flexible coping strategies (FLEX) for Point Beach Units 1 and 2 (with low leakage reactor coolant pump seals installed) results in the completion of boration evolutions prior to loss of RCS sub-cooling. There is no breakdown in single phase natural circulation cooling and the RCS does not enter a reflux cooling period.

Point Beach has incorporated the supplemental guidance provided in the NEI position paper entitled “Shutdown / Refueling Modes” dated September 18, 2013, [5.26] to enhance the shutdown risk process and procedures. The NRC has endorsed the NEI position paper. [5.27].

3.2.2.5. Flex Pumps and Water Supplies

3.2.2.5.1. FLEX SG Pumps (PDSG)

Consistent with NEI 12-06, Appendix D, the auxiliary feedwater injection capability is provided using a portable FLEX SG Pump (PDSG) through a primary or alternate connection. The PDSG pump rating is 325 gpm at 400 psig. The PDSG pump is a trailer-mounted, diesel engine driven, centrifugal pump that is stored in the FLEX Storage Building (FSB). The PDSG pump will provide a back-up SG injection method in the event that the TDAFW pump can no longer perform its function due to low turbine inlet steam flow from the SGs. Hydraulic analyses has confirmed that the PDSG pump is sized to provide the minimum required SG injection flow rate to support reactor core cooling and decay heat removal [5.73]. Since one PDSG pump has sufficient capacity to provide decay heat removal flow to both units, two PDSG pumps are available to satisfy the N+ 1 requirement.

3.2.2.5.2. FLEX Portable Diesel Driven Charging (PDCP) Pumps

The PDCP is a low capacity, high pressure pump capable of delivering 15 gpm at 2,000 psig and verified to be acceptable for this application by the hydraulic analysis in Calculation 2013-12974 [5.34]. A separate PDCP is provided for each unit. Per NEI 12-06, the number of pumps required per site is N+1 therefore, three pumps are available. The pumps are stored on the 8 ft. elevation of the PAB.

3.2.2.5.3. FLEX Mode 5/6 RCS Makeup (PDMU) Pump

The PDMU pumps will be staged on the PAB 8 foot elevation during outage conditions. The pumps are centrifugal type capable of RCS makeup to compensate for decay heat boil off. Hydraulic analysis has confirmed that this pump design is suitable for the application [5.17].

Each unit requires a pump for this application therefore, three pumps are available to satisfy the N+1 requirement. The pumps are stored in the FSB and staged on the 8 foot elevation of the PAB during outage conditions.

3.2.2.5.4. FLEX PDSG Pump Water Sources

The suction sources for the PDSG include:

- CWPH SW pump bay
- CWPH Forebay: direct draft or via the standpipe used for B.5.b
- Lake Michigan direct draft

The SW pump bay is part of the seismically designed CWPH and it is protected from missiles by the CWPH. The pump bay is located downstream of the traveling water screens and trash racks and therefore, is free of large debris created by an external event.

The CLB credits the use of Lake Michigan water as the safety related source of AFW to the SGs for core cooling. In addition, Calculation 2013-0010 [5.68] concluded that there is a -7% reduction in the heat transfer capabilities of the SGs if sand is assumed to plate out on the tubes by introducing 1,613,818 gallons of Lake Michigan water during the first 30 days of the event. Therefore, the SGs could still remove up to 92.9 percent full power which exceeds the approximate 6% decay heat shortly after the reactor trip/shutdown.

3.2.2.5.5. FLEX PDCP and PDMU (Modes 5/6) Pump Water Sources

- Refueling Water Storage Tanks (RWSTs)
  The RWSTs are the primary borated water source. The RWSTs have been seismically qualified however, the tank is not located in a Class I structure that would protect it from tornado wind loading and missiles. The RWSTs are protected from the surrounding plant grade to the 26 ft. plant elevation and protected from the 26 ft. plant elevation up to the 46 ft. plant elevation by adjacent Class I concrete structures; containment building, PAB, SFP transfer

canal, and pipeways 1, 2, 3 and 4. The PDCPs and PDMU pumps both obtain suction from the RWST. The PDMU pump has the limiting NPSH requirement of 10 ft. at a discharge flow of 60 gpm thus it requires a RWST level of 17 feet (plant elevation) [5.17, 5.34, 5.87]. Therefore, the available volume in the RWST is approximately 123,000 gallons [5.29]. This provides approximately 34 hours of decay heat removal. The PDCPs required volume to account for RCP seal leakage, RCS leakage and density changes during cooldown is bounded by the PDMU pump volume requirements for decay heat removal.

- Boric Acid Storage Tanks (BASTs)
  The BASTs are located within the Class I PAB structure and thus protected from wind and missile hazards. The BASTs were originally designed and installed as seismic Class I but were administratively down graded to Class II when their safety related function was changed, however they remain seismically robust [5.30]. The boric acid concentration is maintained between 3.5 and 4.0 Wt% boric acid and the required volume per unit is 7,470 gallons and a minimum temperature of 70°F [5.31]. The BASTs are considered as a backup source of borated water.

3.2.2.6. Electrical Analyses

A battery load management strategy was developed to provide power to credited installed equipment (e.g., DC MOVs, SOVs, etc.) and at least one channel of credited instrumentation during Phase 1. It is performed per FSG-4, ELAP DC Bus Load Shed Management. The DC load stripping will be initiated after the declaration of an ELAP/LUHS event and will be completed within two hours of the start of the event. This time critical operation has been validated. As the connected batteries become depleted, the batteries with remaining capacity will be switched in to replace them. The load stripping and battery re-alignment strategy provides at least 10 hours of DC power before battery charger restoration will be required [5.16]. A portable diesel generator (PDG) will be used to restore power to the battery chargers before all batteries are depleted (Phase 2). Time validation has been performed to demonstrate that the PDG can be deployed and the station battery chargers energized within 8 hours of the event. The PDG connection to the plant is shown schematically on

Figure 3.2.4. One 480 V PDG is required for both units therefore, two are available to satisfy the N + 1 requirement. The PDGs are stored in the FSB.

The FLEX 480 VAC diesel generators are 404 kW standby rating generators that are trailer-mounted with a double-walled diesel fuel tank built into a trailer capable of 8 hours full load fuel supply. The following electric loads are required to be powered by the PDG during Phase 2:

- D-107 or D-108 or D-109 Battery Chargers: 76 kW / 107 kVA
- D-07 or D-08 or D-09 Battery Chargers: 58 kW / 77 kVA
- SI Accumulator Iso. Valve:1(2)SI-841A/B: 5.2 kW / 50 kVA

The primary connection points will be at 1B-03 and 2B-03 which are located in the Cable Spreading Room (CSR), a seismic Category I structure. The PDGs primary location will be between the CWPH and TB and the alternate location is outside the Boiler Room on the Northwest side of the plant. Initially, three cables (1/phase) are routed from the PDG to the newly installed FLEX breaker inserts at 1B-03 and 2B-03]. Considering a cable length of 425 feet outside containment to the alternate PDG location, the voltage at MOVs 1(2)SI-841A/B remains above the degraded voltage values for MOVs as evaluated in EC 278987.

The NSRC will provide medium voltage diesel generators (2 per unit) rated at 4160 VAC and 1 MW. They will be located near the G-03 / G04 DG Building on the north side of the plant at the 28' elevation. Cables from the PDGs will be routed to the G-03/G04 Building and connected at 4160 V Bus 1A-06, Breakers 1A52-77, 1A52-80 or 1A52-86 and 2A-06, Breakers 2A52-90, 2A52-94 or 2A52-95. The justification for utilizing these buses / breakers is documented in EC 278729 (U-1) and EC 278730 (U-2). Drawings E-11 Sh. 4 and E-2011 Sh. 4 have been revised to identify these locations. The major equipment powered by the 4160V PDG includes a CCW Pump, RHR Pump, AFW Pump, SW Pump, SSG or SFP pump and battery chargers. Per Calculation 2004-0002, Rev. 5, "AC Electrical System Analysis" the approximate load is 1500 kW. Considering that there are two 4160 VAC PDGs per unit with 1MW capacity, the 4160V PDGs are adequately sized to provide plant cooldown and spent fuel pool cooling.

3.3. Spent Fuel Cooling Strategies

The basic FLEX strategy for maintaining the spent fuel cool is to monitor SFP level and provide makeup water to the SFP sufficient to maintain the normal SFP level.

3.3.1. Phase 1 Strategy

The SFP temperature is allowed to increase to the boiling point. Prior to boiling, hoses and fittings necessary for makeup or spray strategies are deployed on the SFP refueling deck. SFP level is monitored using instrumentation installed as required by NRC Order EA-12-051 [5.6]. Water will be added (Phase 2) well before fuel becomes uncovered. The PAB is vented by opening the PAB truck access doors and personnel doors as necessary based on PAB conditions per procedure FSG-5, Initial Assessment and FLEX Equipment Staging.

3.3.2. Phase 2 Strategy

Phase 2 strategies initiate makeup using the hoses and fittings deployed into the SFP refueling deck in Phase 1 or utilize flow from the installed PDSG (Figure 3.2.2). A distribution header will allow the PDSG to inject 50 gpm of flow to the SFP via a 2-1/2" connection point downstream of valve BS-350 on the suction of the P-9, Hold Up Tank (HUT) Recirculation Pump without accessing the SFP refueling deck.

Additionally, as required by NEI 12-06, spray nozzles and sufficient hose length required for the SFP Spray Option are available. The equipment is located in designated FLEX job boxes in the Waste Gas Compressor (WGC) Room on the PAB 44 ft. elevation. These hoses will be deployed from the SFP refueling deck down to the 8 ft. elevation of the PAB to connect to the discharge hose from the portable low pressure diesel driven (PDLP) pump.

The PDLP pump is deployed to the north or south of the CWPH. Required hose lengths and fittings for the suction and ground level discharge of the PDLP pump and backup spray nozzles are located in the FSB. The PDLP pump is trailer mounted and will be towed to the selected deployment location by a tow vehicle also located within the protected FSB. A 5" pump discharge hose is routed through the 8 ft. elevation of the TB and PAB where it connects the 2-1/2" hoses from the SFP via a wye connection.

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3.3.3. Phase 3 Strategy

The primary strategy in Phase 3 is to reestablish SW cooling flow to the SFP heat exchangers and provide power to the SFP pumps. The major equipment utilized in this strategy is the high capacity, low pressure pump and 4.16 kVAC PDGs supplied by the NSRC.

3.3.4. Spent Fuel Pool Cooling Strategies Evaluation

3.3.4.1. Plant Structures, Systems and Components

3.3.4.1.1. SFP Strategy Connections

- Primary Makeup Connections
  A 2-1/2" connection point downstream of valve BS-350 on the suction of the P-9, Hold Up Tank (HUT) Recirculation Pump, will allow the addition of a minimum of 50 gpm of raw water from the PDSG to the SFP without accessing the refueling deck. The connection is seismic and located on the 8 foot elevation of the PAB for missile protection. The connection is located in an area that is not susceptible to internal flooding since leakage from a failure of a non-seismic tank or pipe would collect in the -19 foot PAB sump. External flooding for this location has also been evaluated and determined not to have any adverse effects [5.83]. The hydraulic analysis for the use of this connection is bounded by the hydraulic analysis for the PDSG pump flow to the SGs via AFW [5.73].

- Alternate Makeup Connections
  An alternate strategy utilizes a spray option to achieve SFP make-up. The spray strategy (as required by NEI 12-06 Table D-3 for providing spray at 250 gpm per unit) is to provide flow through portable spray nozzles set up on the refueling deck next to the SFP. Two hoses will be run from the SFP refueling deck to the discharge hose of the PDLP pump where they will be connected using a wye fitting. At the SFP refueling deck, 2 spray nozzles

will be clamped to the SFP handrails to spray into the SFP. These spray nozzles will spray water into the SFP to maintain spent fuel assembly cooling.

The PDLP pump, suction and discharge hoses / fittings that are deployed at ground level are stored in the FSB. All equipment used for the SFP spray strategy that are deployed at the SFP elevation or run down to the ground elevation are stored in metal FLEX storage boxes in the (WGC room on the 44 ft. elevation of the PAB which is a seismic structure. The WGC room is equipped with robust walls with a minimal door opening which will protect the equipment from missile damage. The FLEX Hose trailer is also equipped with two spray nozzles.

- SFP Ventilation
  Ventilation requirements to prevent excessive steam accumulation in the PAB are satisfied by blocking open personnel and equipment doors. Airflow through these doors provides adequate vent pathways through which the steam generated by SFP boiling can exit the PAB. With the opening of these doors, the SFP area temperature will not exceed 108°F [5.69].

3.3.4.1.2. Plant Instrumentation

The key parameter for the SFP Make-up strategy is the SFP water level. The SFP water level is monitored remotely by the redundant instrumentation that was installed in compliance with Order EA-12-051 [5.6].

3.3.4.2. Thermal-Hydraulic Analyses

Assuming a loss of SFP cooling with the worst case design heat load (including a full core offload) and an initial temperature of 145 °F, the time-to-boil is approximately 7 hours [5.35]. This is very conservative considering PBNP maintains SFP temperatures lower than 145 °F. PBNP tracks the SFP heat load on a real time basis. Based on typical SFP heat loading, and assuming a full core offload with an initial SFP temperature of 100°F, the projected time for the SFP to reach 200°F is approximately 11 hours [5.36 and 5.37]. Therefore, there is adequate time to access the upper elevation of the PAB and SFP to open doors for venting and install the SFP spray nozzles. After reaching the boiling point, it would take an additional 71 hours for the SFP to boil down to 6 inches above the fuel [5.38]. Action will be initiated prior to the spent fuel pool lowering to a level of 2 feet 11 inches above the fuel per FSG-11, Alternate SFP Makeup and Cooling. This level corresponds to the height of the east-west wall opening that separates the northern and southern areas of the pool. The level was chosen to ensure the SFP continues to function as a single pool for level monitoring reliability. A makeup water supply of 50 gpm is adequate to maintain SFP level [5.35]. Spent fuel pool criticality analysis allows the use of non-borated water [5.35].

3.3.4.3. FLEX Pumps and Water Sources

3.3.4.3.1. FLEX Pumps (PDSG or PDLP) for SFP

Water is added to the SFP with a portable diesel driven pump using either direct addition or spray. A 2-1/2" connection point at valve BS-350 on the suction of the P-9, Hold Up Tank (HUT) Recirculation Pump will allow the addition of a minimum of 50 gpm of raw water from the pumps to the SFP without accessing the refueling deck. A makeup water supply of 50 gpm is adequate to maintain SFP level [5.35]. Spent fuel pool criticality analysis allows the use of non-borated water [5.35]. A distribution manifold allows the PDSG pump to inject this flow to the SFP while also providing flow to the SGs [5.73].

The PDLP pump may be aligned with the SW pump bay, forebay or Lake Michigan to provide 500 gpm of spray to the SFP. The pump is rated at 1000 gpm at approximately 160 psig at 1800 rpm. The hydraulic analysis for SFP spray is bounded by B.5.b hydraulic calculation [5.74]. Since one PDLP pump can supply the common SFP and both units of Containment Spray requirements, two PDLP pumps are available to satisfy the N+ 1 requirement.

3.3.4.3.2. Water Supplies

The pumps (PDSG or PDLP) will draw raw water from the CWPH SW pump bay, forebay (directly or via the B.5.b standpipe) or direct draft from Lake Michigan. These sources are further described in Section 3.2.2.5.4.

3.3.4.4. Electrical Analyses

The SFP will be monitored by instrumentation installed by Order EA-12-051. The power for this equipment has backup battery capacity for 72 hours. Normal supply sources are repowered utilizing Phase 2 and Phase 3 FLEX coping strategies to ensure power to the instruments is maintained.

3.4. Containment Function Strategies

PBNP installed low leakage RCP seals for both units which will prevent significant leakage from the RCS seals into containment. During Phase 1, containment pressure is monitored, but there is no significant mass release to containment expected and the containment safety function is not challenged. The RCP seal leakage is assumed to be 1 gpm per pump and an RCS Technical Specification allowed leak rate of 1 gpm (typical RCS leakage is approximately 0.1 gpm) is assumed for a total RCS leak rate of 3 gpm. A containment analysis based on the use of low leakage RCP seals and the FLEX mitigation strategy has determined that approximately 2 days after the ELAP, the containment pressure will reach of value of 17.2 psia and temperature will reach 148° F. [5.40]. These values are significantly less than the design limits of 75 psia and 286° F.

In MODES 5 and 6, the plant Technical Specifications do not require containment operability other than the specific closure requirements of Technical Specification Limiting Condition for Operation 3.9.3, "Containment Penetrations." While the containment may not initially be isolated in MODE 5 or 6, plant procedures require containment closure capability prior to bulk boiling when the RCS is not intact. Containment closure can be accomplished following a loss of power event. The consideration of the RCS being intact includes the ability to remove decay heat via natural circulation (i.e., SG available) [5.41, 5.42].

3.4.1. Phase 1 Strategy

The Phase 1 coping strategy for containment involves verifying containment isolation as required and monitoring containment temperature and pressure using installed instrumentation. Containment pressure and temperature will be available via essential plant instrumentation.

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3.4.2. Phase 2 Strategy

During Phase 2, containment pressure and temperature are monitored to ensure the containment safety function is not challenged. If containment conditions warrant, a portable diesel driven low pressure (PDLP) pump will supply water to the Containment Spray (CS) system via an adapter that will replace the cover of a CS pump discharge check valve, 1(2)SI-862A/B as shown on Figure 3.5.1 for Unit 1. This strategy is currently applied in the plant B.5.b response. In Modes 5 and 6, SEP 3.0 [5.11] requires containment closure to be established unless a containment vent path is required for the ELAP condition.

FSG-12, Alternate Containment Cooling, provides the following containment vent paths:

- The primary method for venting the containment is by opening Containment Hatch doors.

Alternate methods include:

- Vent the containment via the deflated T-ring seal on Containment Supply and Exhaust Dampers.
- Vent the containment using Hydrogen Recombiner Valves 1H2-V-4 and 1H2-V-5 or 1H2-V-22 and 1H2-V-23

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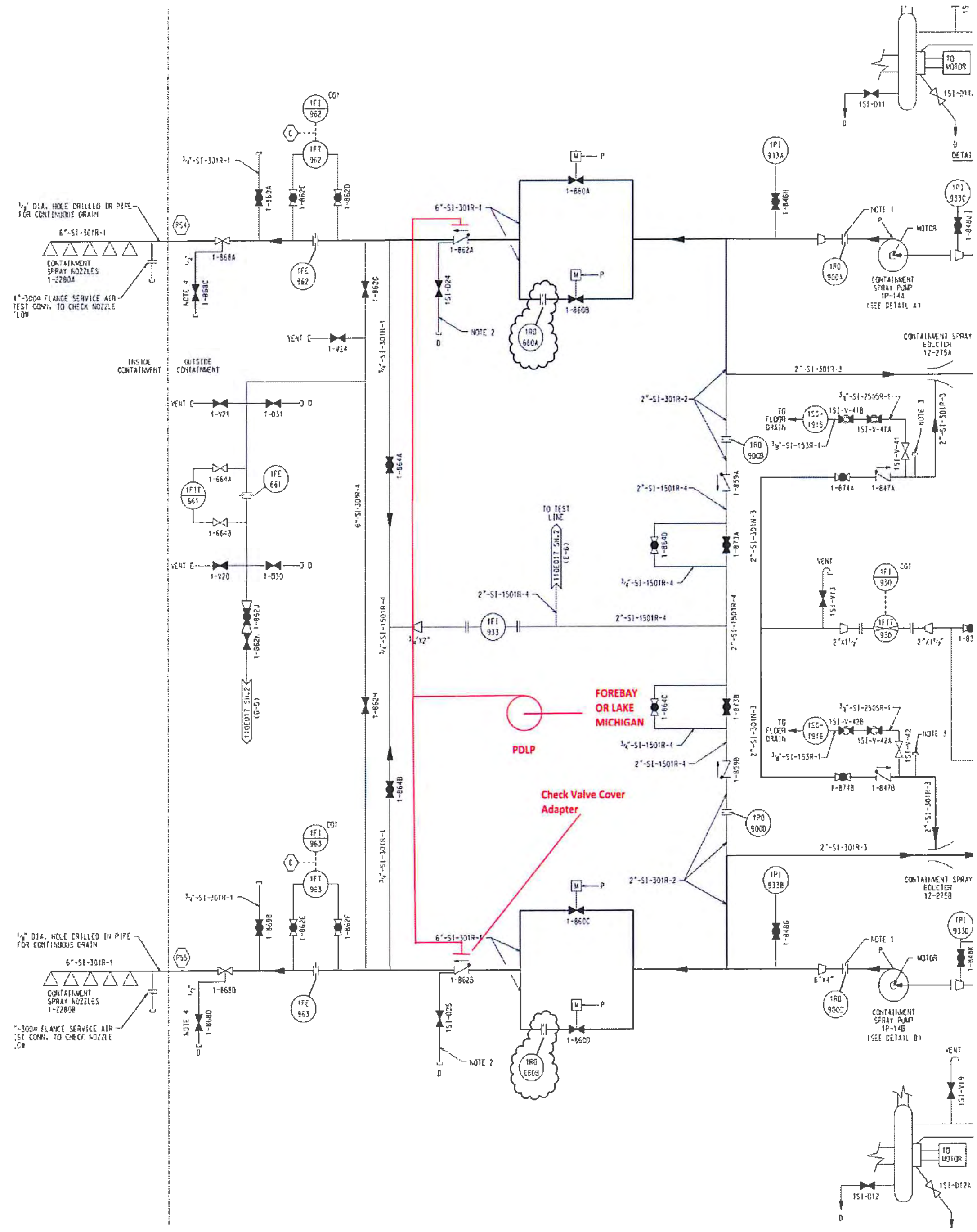

Figure 3.5.1
Containment Spray Using PDLP Pump

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3.4.3. Phase 3 Strategy

The strategies implemented during Phase 2 are capable of maintaining containment for an indefinite amount of time. Phase 3 strategies are focused on providing defense in depth and the recovery of normal containment heat removal capabilities. Necessary actions to reduce Containment temperature and pressure and to ensure continued functionality of the key parameters will utilize existing plant systems restored by off-site equipment and resources during Phase 3. The primary strategy in Phase 3 is to restore power to the containment cooling fans and cooling water flow to the containment fan coolers.

3.4.4. Containment Strategies Evaluation

3.4.4.1. Plant Structures, Systems and Components

3.4.4.1.1. Containment Ventilation Strategy Equipment and Connections

- Primary and Secondary Makeup Connections
  A PDLP pump will supply water to the Containment Spray (CS) system via an adapter that will replace the cover of a CS pump discharge check valve, 1(2)SI-862A/B. . The connection is seismic and located on the 8 foot elevation of the PAB for missile protection. The connection is located in an area that is not susceptible to internal flooding since leakage from a failure of a non-seismic tank or pipe would collect in the -19 foot PAB sump. External flooding for this location has also been evaluated and determined not to have any adverse effects [5.83].

3.4.4.1.2. Containment Strategy Instrumentation

Essential Instruments providing the following key parameters is credited for all phases of the Containment Integrity strategy:

- Containment Pressure
- Containment Temperature

3.4.4.2. Thermal-Hydraulic Analyses

An evaluation of the containment for the ELAP conditions has concluded that containment temperature and pressure remain below containment design limits for approximately two days. Thus, essential instruments subject to the containment environment will remain functional.

The PDLP pump may be aligned with the SW pump bay, forebay or Lake Michigan to provide Containment Spray. The pump is rated at 1000 gpm at approximately 160 psig at 1800 rpm. The hydraulic analysis for containment spray is bounded by B.5.b hydraulic calculation [5.74].

For Modes 5 and 6 without SGs, SEP 3.0 and FSG-12 establish a containment ventilation strategy that primarily uses the containment hatch doors to ventilate containment

3.4.4.3. FLEX Pumps and Water Sources

The PDLP pump is utilized for containment spray to provide containment cooling. The NSRC is providing a high capacity low pressure pump which will be used to provide cooling loads as described in Section 3.4.3. Water supplies are as described in Section 3.2.2.5.4.

3.4.4.4. Electrical Analyses

The 4.16KV equipment being supplied from the NSRC will provide adequate power to perform the noted strategies.

3.5. Characterization of External Hazards

3.5.1. Seismic

The seismic design of PBNP safety related structures is discussed in Final Safety Analysis Report (FSAR) Appendix A.5, "Seismic Design Analysis." The seismic loading conditions are established by the "Operating Basis Earthquake" (OBE) and "Safe Shutdown Earthquake" (SSE). The former is selected to be typical of the largest probable ground motion based on the site seismic history. The latter is selected to be the largest potential ground motion at the site based on seismic and geological factors and their uncertainties. Earthquake loading is derived from an OBE at the site having a horizontal ground acceleration of 0.06g. In addition, a SSE having a horizontal ground acceleration of 0.12g is used to check the design to assure no loss of function. A vertical component of ground acceleration of 2/3 of the magnitude of the horizontal component is applied in the load equations simultaneously [5.67]. Post-earthquake or liquefaction stability analyses indicate that a liquefaction stability failure is highly unlikely regardless of the magnitude of the earthquake at PBNP.

Following the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the Nuclear Regulatory Commission (NRC) established a Near Term Task Force (NTTF) to conduct a systematic review of NRC processes and regulations and to determine if the agency should make additional improvements to its regulatory system. The NTTF developed a set of recommendations intended to clarify and strengthen the regulatory framework for protection against natural phenomena. Subsequently, the NRC issued a 50.54(f) letter on March 12, 2012 [5.44], requesting information to assure that these recommendations are addressed by all U.S. nuclear power plants. The 50.54(f) letter requests that licensees and holders of construction permits under 10 CFR Part 50 reevaluate the seismic hazards at their sites against present-day NRC requirements and guidance. The letter also required further risk assessment depending on the comparison between the reevaluated seismic hazard and the current design basis. Assessment approaches acceptable to the staff include a seismic probabilistic risk assessment (SPRA), or a seismic margin assessment (SMA). Based upon the assessment results, the NRC staff will determine whether additional regulatory actions are necessary.

NRC 2014-0088 [5.30] describes the Expedited Seismic Evaluation Process (ESEP) undertaken for PBNP. The intent of the ESEP is to perform an interim action in response to the NRC's 50.54(f) letter [5.44] to demonstrate seismic margin through a review of a subset of the plant equipment that can be relied upon to protect the reactor core following beyond design basis seismic events.

The ESEP is implemented using the methodologies in the NRC endorsed guidance in EPRI 3002000704 [5.45].

NRC 2014-0088 provides a summary describing the ESEP evaluations and results. The selection of equipment to be included on the ESEL was based on installed plant equipment credited in the FLEX strategies during Phases 1, 2 and 3 mitigation of a BDBEE, as outlined in the Point Beach Overall Integrated Plan (OIP) in Response to the March 12, 2012, Commission Order EA-12-049 [5.46]. The scope of "installed plant equipment" includes equipment relied upon for the FLEX strategies to sustain the critical functions of core cooling, spent fuel pool cooling and containment integrity consistent with the Point Beach OIP [5.46]. FLEX recovery actions and portable equipment are excluded from the ESEP scope per EPRI 3002000704 [5.45]. The overall list of planned FLEX modifications and the scope for consideration herein is limited to those required to support core cooling, reactor coolant inventory, subcriticality, containment integrity and spent fuel pool cooling functions.

PBNP has performed the ESEP as an interim action in response to the NRC's 50.54(f) letter [5.44]. The Ground Motion Response Spectrum (GMRS) for PBNP exceeds the PBNP SSE acceleration values in the 1- 10 Hz range. A Review Level Ground Motion (RLGM) was determined based on increasing the horizontal SSE by a factor of 1.91 (the maximum ratio between the GMRS and SSE). The peak acceleration of the RLGM for PBNP equals 0.382g. EPRI NP-6041 uses screening values of 0.8g and 1.2 g ground peak spectral accelerations. Therefore, the PBNP ESEL components were screened against the 0.8g column from EPRI NP-6041. Each item on the ESEL shall have sufficient seismic capacity to meet or exceed the demand characterized by the RLGM. The seismic capacity is characterized as the peak ground acceleration (PGA) for which there is a high confidence of a low probability of failure (HCLPF). The HCLPF must be greater than the RLGM PGA.

The ESEP provides an important demonstration of seismic margin and expedites plant safety enhancements through evaluations and potential near-term modifications of plant equipment that can be relied upon to protect the reactor core following beyond design basis seismic events.

Insights from the ESEP identified the following four items where the HCLPF is below the RLGM and plant modifications will be made in accordance with EPRI 3002000704 to enhance the seismic capacity of the plant. Modifications 1, 2 and 3 are standalone modifications and are not required for implementation of the PBNP FLEX strategies in accordance with NRC Order EA 12-049:

1. Masonry Wall 111-2/23 has a HCLPF below the RLGM and requires modification. This wall is located along the West side of the control room. The ESEL items affected by this wall are 2Y 01, 2Y-03, C 01, 1C-03, 1C-04, C-02, 2C-03, & 2C-04. The proposed modification includes the addition of a post at mid-span of the wall in order to reduce the span length of the wall, reducing in-plane wall stresses to acceptable levels.
2. Masonry Wall 111-4N/23 has a HCLPF below the RLGM and requires modification. This wall is located along the West side of the control room. The ESEL items affected by this wall are C 01, 1C-03, 1C-04, C-02, 2C-03, & 2C-04. The proposed modification includes the addition of a post at mid-span of the wall in order to reduce the span length of the wall, reducing in-plane wall stresses to acceptable levels.
3. The Work Control Center (WCC) block walls on the Turbine Deck have a HCLPF below the RLGM and requires modification. The ESEL items affected by this wall are LT-4038, LT-4041, T-24A, & T-24B. A modification (i.e. reinforcement of the block walls or relocation of soft targets away from the path of falling debris) must be installed such that falling debris will not affect the level transmitters or sensitive tubing attached to the Condensate Storage Tanks located below the WCC.
4. The evaluation of the anchorage for the Condensate Storage Tanks (T-24A & T-24B) is acceptable after the installation of the approved anchorage modification (Engineering Change (EC) 279034, NRC Order Fukushima FLEX CSTs – Seismically Upgrade and Missile Protect Bottom 6 feet). The seismic upgrade of the CST was listed as a Pending Action in the Point Beach Overall Integrated Plan (OIP) in Response to the March 12, 2012, Commission Order EA-12-049. Installation of anchorage modifications has been completed.

All the equipment staging locations and the connection points for the temporary equipment are located in Seismic Class 1 structures (Control Building, PAB, CWPH, DG building) or areas determined to be seismically robust. The façade is not a seismic structure however it is seismically robust. Portions of the AFW system are located in the Turbine Building (TB) which is not a Seismic Class I structure but was seismically analyzed during original design and found capable of withstanding SSE loads [5.65]. Hoses and cables will also be routed through the TB to connect the portable equipment to plant systems. Therefore, PBNP has ability to connect portable FLEX equipment to plant systems to mitigate a BDBEE caused by seismic activity.

3.5.2. Flooding

- Internal Flooding
  Internal flooding of the PAB has not been formally analyzed. Internal flooding would be the result of a failure of a non-seismic tank or non-seismic SW piping during an earthquake. In the event of a PAB internal flooding scenario, water would collect in the -19 ft. elevation of the PAB. All PAB connections are above this elevation. All FLEX pumps have at least one suction and discharge connection above the 8 ft. elevation of the PAB or at a connection not susceptible to internal flooding (i.e. Lake Michigan or forebay via the B.5.b standpipe or direct draft). PDG connections are located in the CSR which is protected from internal flooding [5.48].

- External Flooding
  The license basis level for protection of critical equipment from lake flooding is +9.0 feet [5.47]. At least one of the two connection points is located above this elevation. The bounding external flooding event can be either a maximum wave run-up event or a maximum precipitation event. There are no rivers or large stream at or near PBNP [5.47]. The site topography and hydrology both serve to minimize the potential flooding vulnerability. All critical plant components are protected from flooding by the strategies outlined in FSAR Appendix A.7 [5.48]. Station procedures have been established to address external flooding [5.49 and 5.50].

  A flooding hazards reevaluation was performed pursuant to Title 10 of the Code of Federal Regulations (CFR) 50.54(f) letter, dated March 12, 2012. The reevaluation identifies that one hazard, Local Intense Precipitation, exceeds the current license basis for Point Beach Nuclear Plant, Units 1 & 2. The results of all other hazards evaluated are bounded by the current licensing basis. An Integrated Assessment will be performed for the Local Intense Precipitation (LIP) event with a submittal to be provided by March 12, 2017 [5.51]. Per NRC Letter dated May 26, 2015 [5.66], the integrated assessment has been deferred until future notice. LIP flood levels are below +9.0 foot level for all FLEX equipment locations except for the TB and areas outside the TB. However, the flood levels in these areas recede below the +9.0 foot level in these locations well in advance of the deployment of FLEX equipment to these areas. Therefore, PBNP has determined that the site remains capable of implementing the FLEX strategies during a LIP event. [5.75] [5.83]

3.5.3. Tornado

PBNP is not a coastal site and thus not exposed to hurricane hazards. Regional history with tornadoes does exist for PBNP. PBNP location falls in Region 1 of Figure 7.2 of NEI 12-06. This would correspond to a location with a one in a million probability of tornado wind speeds approaching 200 mph. The PBNP design basis for Class I safety related structures is a tornado with winds of 300 mph plus a forward velocity of 60 mph and corresponding missiles [5.52, 5.53, 5.54]. The containments and Seismic Class I portions of the Auxiliary Building, the turbine hall, the pumphouse, and the diesel generator building are designed to withstand the effects of a tornado. The design basis for tornado missile protection of systems and components is that it is possible to shut the plant down and keep it in hot shutdown during and after the passage of a tornado. The equipment needed for this event remains operable if:

a) Critical items are housed in structures capable of withstanding tornado winds, depressurization, and missiles;

OR

b) the separation provided between redundant systems or components is such that reasonable assurance exists that a single missile cannot render both systems or components inoperable and large structures, such as facade, auxiliary building superstructure, turbine buildings, etc., are so designed that they will not collapse and fall on redundant components or systems [5.1].

Plant equipment and connection locations utilized for FLEX strategies are either in Class I structures or are located in structures designed not to collapse in the event of a tornado and are redundant.

3.5.4. Snow, Ice and Extreme Cold

Regional experience with snow, ice and low temperatures does exist for PBNP. From Figure 8.2 of NEI 12-06, the PBNP location falls under Region 5, corresponding to the highest region for ice severity. Per the PBNP FSAR [5.55], snowfall averages 45 inches per year with a maximum of 15 inches in 24 hours recorded in January 1947. Ice storms are infrequent in this region of Wisconsin [5.55]. The hazard would include frost, ice cover, frazil ice, snow and extreme low temperature. It does not include an avalanche for PBNP. An outside air temperature of -25.0°F has been used in the PBNP design [5.43]. Design Basis Document (DBD)-29 "Auxiliary Building and Control Building HVAC," [5.56] specifies a winter temperature of - 15°F [5.56]. FSAR Figure 2.6-1 "Climate of Point Beach Site Region," [5.55] shows a minimum temperature of less than -20°F. The current 50 year low is -28.1°F per the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) 1 % data (1 % of the hours, 7 hours, in a month of 50 years exceed that value). The average temperature swing is approximately 12° F in the coldest months.

For FLEX equipment, a minimum temperature of -28 °F is used for design and procedural guidance will be provided for starting FLEX equipment operated outdoors in cold weather conditions. Major FLEX equipment exposed to the environment is shown below with their low temperature limit:

PDSG:	-28° F	[5.80]
PDG:	-40° F	[5.81]

Per the vendor, the PDLP does not have a documented low temperature limit however, considering that the engine will be started in a temperature controlled FSB, its operation will not be affected by the cold weather conditions [5.82].

For hoses located outside, constant flow will be established through them or the hoses will be drained when they are not in service to prevent freezing. Since the cold weather event is not combined with any other event, the buildings will remain structurally intact and thermal mass in the buildings will prevent adverse effects from the loss of building heat. The plant heat tracing system is also intact and the PDG connected to 1B-03 and 2B-03 could be used to power those portions of the heat trace system. Temporary heaters, insulation blankets and temporary enclosures are also available to maintain the operation of the portable equipment. The main water source is the supply from Lake Michigan either directly or via the forebay or pump bay. Frazil ice is not a concern since the relatively lower water supplies will result in less ice buildup on structures and the lower flows do not require as large of a cross sectional area as available for normal plant operations. The PDSG is equipped with an 8 inch diameter suction hose allowing the pump to draw water near the exit of the discharge flume in the event of a heavy ice buildup along the shore [5.73]. The PDLP can also draw water from this location with a 6 inch diameter suction hose [5.39].

3.5.5. Extreme Heat

Regional experience with high temperatures does exist for PBNP. DBD-29 "Auxiliary Building and Control Building HVAC" specifies a summer temperature of 95°F [5.56]. FSAR Figure 2.6-1 "Climate of Point Beach Site Region," shows a max temperature of greater than 100°F [5.55]. The current 50 year high is 105.5° F per ASHRAE 1% data (1% of the hours, 7 hours, in one month of 50 years exceed that value) with an average temperature swing of approximately 17° F in the hottest months. Based on the previous information, PBNP used 105.5° F for extreme environmental conditions. Major FLEX equipment exposed to the environment is shown below with their upper temperature limit:

PDSG:	120° F	[5.80]
PDG:	122° F	[5.81]

Per the vendor [5.82], the PDLP has a maximum temperature of 118 °F.

3.6. Planned Protection of FLEX Equipment

The FLEX equipment is stored in existing Class 1 structures or in a structure designed and constructed in accordance with the requirements of NEI 12-06. The north half of the Steam Generator Storage Building (SGSB) has been upgraded to qualify as the FLEX Storage Building (FSB). It is a concrete structure located just north of PBNP and directly outside of the security fence. It has been analyzed for 2X seismic and tornado loading to qualify it for FLEX purposes. The FSB provides adequate space and protection and is used as the primary storage location for essential FLEX equipment. The FSB is located at approximately the 31 ft. plant elevation and it is adjacent to topography which slopes to Lake Michigan. Thus, the FSB is not susceptible to flooding events. The FSB has ventilation to maintain temperatures within equipment manufacturers' recommendations.

Debris removal / tow trucks (Ford F-350 and F-550) are stored inside the FSB in order to be protected from the applicable external events such that the equipment will remain functional and deployable to clear obstructions from the pathway between the equipment's storage location and its deployment location. A CAT wheel loader will be stored in the south end of the SGSB. The south end is not fully protected since the west wall is a 2 ft. thick block wall that was not designed for tornado wind loads. The loader is parked facing the west wall thus, allowing it to remove debris in the event of a failure of the wall. Since the CAT wheel loader is not fully protected, an alternate piece of debris removal equipment is located on the south end of the site at a sufficient distance to prevent a tornado from impacting both.

A FLEX program document stipulating the required administrative controls over FLEX equipment has been implemented.

Existing plant configuration control procedures have been modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies. This is outlined in the program document.

3.7. Planned Deployment of FLEX Equipment

3.7.1. Haul Paths and Accessibility

The preferred and alternate deployment routes are shown on Figure 3.7.1. The deployment is governed by the FSGs. The deployment of credited FLEX equipment to the designated primary and secondary connection points within the required time frame was resource and time validated. The preferred route follows a portion of the route used for spent fuel storage canister transport, past the emergency diesel building and down the road above Safety Related cable ducts. The spent fuel transport route and the G-03/G-04 building and cable route have been analyzed for soil liquefaction. Liquefaction stability failure of the deployment path is highly unlikely regardless of the magnitude of the earthquake at PBNP. This conclusion was based on studies performed in support of the PBNP IPEEE response [5.57]. This is also supported by studies performed in relation to the PBNP Independent Spent Fuel Storage Installation (ISFSI) [5.58 and 5.59]. The gate and vehicle barrier in the route will be manually opened by Security in accordance with existing instructions for B.5.b deployment. The preferred route is through an open non-forested area. However, this route does have an overhead AC service line along a portion of the path. If the line is down across the path, it will be disconnected from its supply power but considered potentially energized. It will be moved using debris removal and electrical safety equipment. Also, warehouses and buildings which are not designed for seismic or tornado wind loads exist alongside the deployment route. Debris along the route will be removed using designated FLEX debris removal equipment. The majority of deployment route and staging area is located above the flood elevation. Locations near the CWPH and east side of the TB are susceptible to immediate flooding conditions however levels will recede by the time equipment is deployed.

The deployment of onsite FLEX equipment to implement coping strategies beyond the initial plant capabilities (Phase 1) requires that pathways between the FSB and various deployment locations be clear of debris resulting from BDBEE seismic, high wind (tornado), or flooding conditions.

The stored FLEX equipment includes tow vehicles with plows and a wheel loader to move or remove debris from the needed travel paths.

Phase 3 of the FLEX strategies involves the receipt of equipment from offsite sources including the NSRC and various commodities such as fuel and supplies. Transportation of these deliveries can be through airlift or via ground transportation. PBNP is partnered with the Strategic Alliance for Flexible Emergency Response (SAFER) to ensure delivery of required FLEX equipment from the NSRC. Debris removal for the pathway between the site and the NSRC receiving location and from the various plant access routes may be required. The same debris removal equipment used for on-site pathways is available to support debris removal to facilitate access to the owner controlled area. Also, highway departments in Kewaunee, Manitowoc and Brown counties can provide support in clearing roads to the owner controlled area per EPG 2.0, PBNP Site SAFER Playbook.

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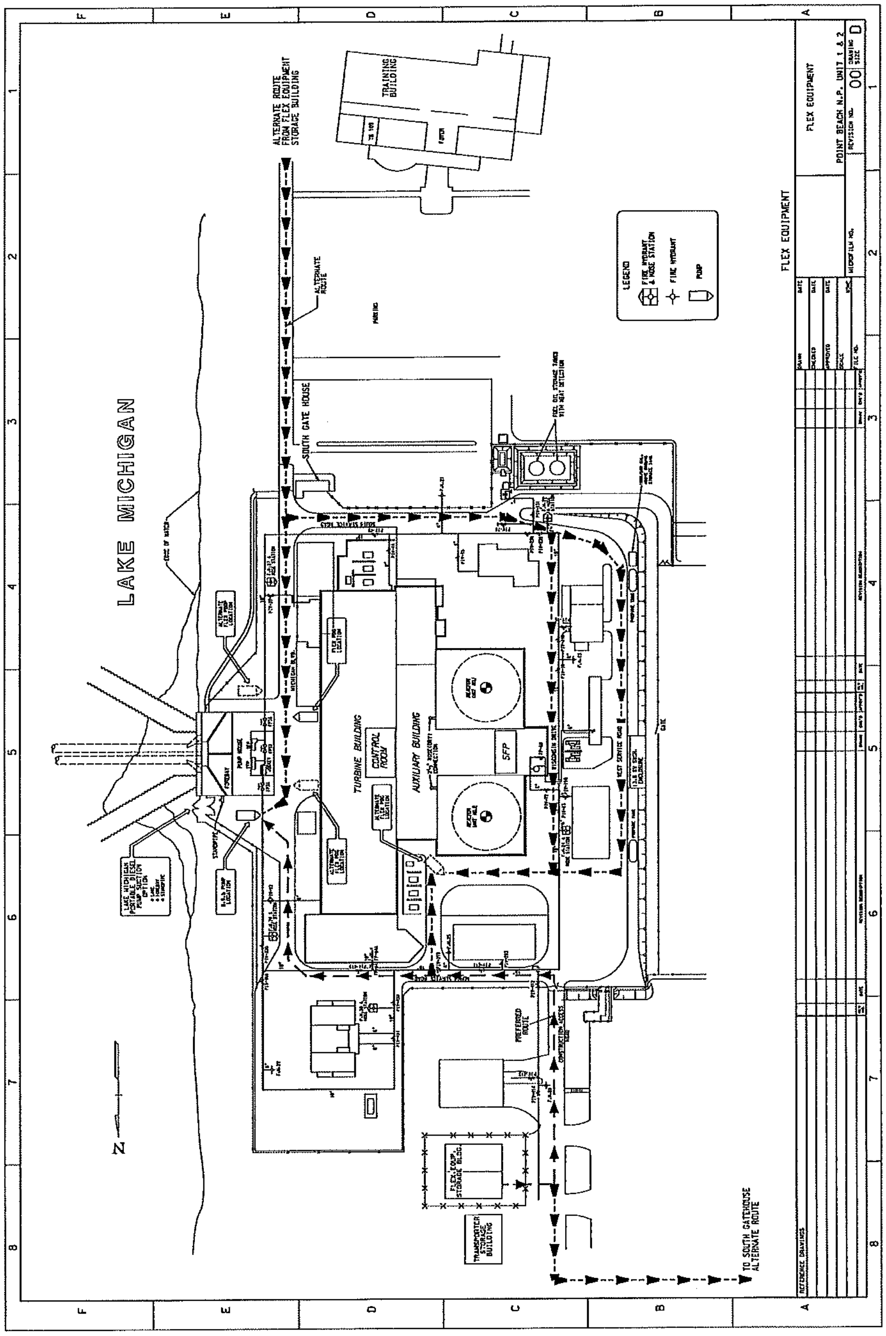

Figure 3.7.1 FLEX Storage Building (FSB) and Haul Routes

3.7.2. FLEX Equipment Transport, Connection and Refueling

3.7.2.1. RCS Cooling and Heat Removal FLEX Equipment Deployment

The FLEX portable diesel driven SG Pump (PDSG) provides the backup for the TDAFW pump during Phase 2. The PDSG Pump is connected to MDAFW discharge connection located within the seismic category I, missile protected, 8 ft. elevation of the PAB. The PDSG Pump will be transported from the FSB to a location near the CWPH. The PDSG Pump's primary suction connection is the SW pump bay located inside the seismic Category I, tornado missile protected CWPH.

In the case where the CWPH SW pump bay or forebay are unavailable, the PDSG pump will be deployed to obtain suction via direct draft from Lake Michigan. Lake Michigan provides an indefinite supply of water for RCS Cooling and Heat Removal with flow directly to the suction of the PDSG pump. The CWPH and Lake Michigan will remain available for any of the external hazards listed in Section 3.5. The normal suction hose diameter is 6 inches. In the event of excessive ice buildup along the Lake Michigan shore, 8 inch diameter suction hose is also available for a longer suction hose run. The PDSG pump discharge will be routed to the MDAFW pump discharge connections as previously described.

3.7.2.2. RCS Makeup (Modes 5/6 w/o SGs) FLEX Equipment Deployment

The Mode 5/6 RCS Makeup Pumps (PDMU) pump(s) are staged on the 8 ft. elevation of the PAB during outages. The primary suction source is from the RWSTs. The connection is located on the RWST drain line via an adaptor. The alternate supply should the Unit's RWST become unavailable is from the BASTs by replacing the bonnet on 1(2)SI-825C with a hose adapter. The PDMU pump discharge hose is deployed to a RCS makeup connection located on the 8 ft. PAB elevation at 1(2)RH-719 to provide a path to the RCS cold legs of that unit. Accordingly, these connections are protected against all BDBEE hazards. The alternate discharge connection is at the RHR Heat Exchanger drain lines on the -5 ft. elevation of the PAB.

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3.7.2.3. RCS Makeup (Charging)Pumps FLEX Deployment

The portable diesel driven charging pumps (PDCPs) pumps are staged on the 8 ft. elevation of the PAB. The primary suction source is from the Seismic Class I, RWST's. The connection is located on the RWST drain line via an adaptor. The alternate supply should the Unit's RWST become unavailable is from the BASTs by replacing the bonnet on 1(2)SI-825C with a hose adapter. The PDCP's discharge hoses will be deployed to connections on the CVCS, B and C Charging Pump discharge drains also located on the 8 ft. of the PAB. Therefore, due to the limited mobility of these pumps and the practical suction and discharge connections on the PAB 8 ft. elevation, they are stored on the 8 ft. elevation of the PAB instead of the FSB.

3.7.2.4. Spent Fuel Pool Makeup or Spray FLEX Equipment Deployment

The portable diesel driven low pressure (PDLP) pump stored in the FSB will be deployed to a location near the CWPH. The discharge hose of the PDLP pump will be deployed through the 8 ft. elevation of the TB and PAB. On the PAB 8 ft. elevation, a wye connection is deployed. Hoses, previously routed down from the SFP refueling deck, are connected to the wye to complete the SFP spray hose routing. The SFP makeup strategy is deployed by attaching a hose at the PDSG pump supply distribution header and connecting it to the P-9 suction at BS-350. The connection is made by removing the threaded cap at BS-350 and threading on a transitional fitting that contains a 2-1/2 inch hose connection. The connection at BS-350 is missile protected by the PAB.

3.7.2.5. 480V Repowering FLEX Equipment Deployment

A single FLEX 480 VAC generator for both Unit 1 and Unit 2 is deployed to the west side of the roadway between the TB and CWPH in a FLEX event. The alternate PDG location is outside the Boiler Room on the Northwest side of the plant. A 480 VAC PDG is used to power credited installed equipment via the safety related 480 VAC distribution system. The PDG is rated for 404 kW / 505 kVA. The following electric loads are required for Phase 2:

- D-107 or D-108 or D-109 Battery Chargers: 76 kW / 107 kVA
- D-07 or D-08 or D-09 Battery Chargers: 58 kW / 77 kVA
- SI Accumulator Iso. Valves: 1(2)SI-841A/B: 5.2 kW / 50 kVA

Therefore, the PDGs have sufficient capacity for this application and maintain a reserve for auxiliary power feeds of temporary or permanent plant equipment.

The primary connection points are at 1B-03 and 2B-03 which are located in the Cable Spreading Room (CSR) in the Control Building, a seismic Category I structure. Initially, three cables (1/phase) are routed from the PDG to the newly installed FLEX breaker inserts at 1B-03 and 2B-03. Additional cables can be installed later in the scenario. The installation is governed by FSG-5.

3.7.2.6. FLEX Equipment Refueling Deployment

The FLEX strategies for maintenance and/or support of safety functions involve several elements including the supply of fuel to necessary diesel powered generators, pumps, hauling vehicles, etc. The general coping strategy for supplying fuel oil to diesel driven portable equipment, i.e., pumps and generators, being utilized to cope with an ELAP/LUHS, is to draw fuel oil out of any available existing diesel fuel oil tank at PBNP.

The primary source of fuel oil for portable equipment is the underground Diesel Fuel Oil Storage Tanks (T-175A/B). These tanks are Safety Related, seismic, wind and missile protected. There are located just below grade in the G-03/G04 DG Building, 28 ft. elevation. Therefore, the tanks are not subject to external flooding affects. Technical Specification requirements ensure greater than 64,000 gallons of fuel oil is maintained on site in Safety Related, seismic Class I tanks [5.60]. This fuel is available to supply permanently installed and/or portable diesel powered equipment credited for a FLEX mitigation strategy. This is accomplished with the use of a 500 gallon refueling trailer towed by a Ford F-350 or equivalent truck. The trailer truck combination has the capability to draw fuel oil from on-site fuel oil tanks. Conservatively estimating a consumption of 150 GPH and the ability to draw approximately 2/3 of the T-175A/B contents (42,000 gallons), results in at least an 11 day supply of fuel oil per the PBNP FLEX Refueling Strategy in NP 7.7.36 PBNP FLEX Program Document. The refueling trailer is stored in the FSB. FSG-5 provides fuel burn up rates and fueling strategies for all portable diesel driven FLEX equipment.

Diesel fuel in the fuel oil storage tanks is routinely sampled and tested to assure fuel oil quality is maintained to ASTM standards. This sampling and testing surveillance program also assures the fuel oil quality is maintained for operation of the station Emergency Diesel Generators.

The diesel fuel from off-site sources is needed to supply the large LUHS pump and 4.16kV generators to be received from the NSRC.

The BDBEE response strategy includes a very limited number of small support engine powered equipment (chain saws, chop saws and small electrical generator units). These components are fueled / re-fueled using small portable containers of fuel, gas and diesel, located in the FSB or designated FLEX storage locations in the plant which contain diesel fuel only.

3.8. Offsite Resource Utilization

Phase 3 deployment involves offsite resources providing additional portable equipment. PBNP has contracted with SAFER to receive a "generic" set of equipment. The list of generic equipment is provided in the National SAFER Response Center (NSRC) Equipment Technical Requirements Document [5.61]. A contract has been established with AREVA to provide the necessary equipment to PBNP when requested. AREVA has established an organization (SAFER) to manage the NSRC that stores and maintains the necessary equipment for Phase 3 coping strategies in Memphis, TN and Phoenix, AZ. A SAFER playbook, EPG 2.0, has been developed that controls the process for requesting equipment, identifying staging areas and transport routes to the plant. The playbook is coordinated with other Emergency Plan procedures to identify the ERO positions responsible for execution.

On-site FLEX equipment hose and cable end fittings are standardized or provided with transitions fitting to accommodate the equipment supplied from the NSRC. In the event of a BDBEE and subsequent ELAP/LUHS condition, equipment will be moved from an NSRC to a local assembly area established by the SAFER team. SAFER offsite equipment will be transported to the staging area north of the plant by one of several methods including air and highways. The SAFER equipment will arrive at the site staging area between 24 and 96 hours into the event. The equipment will be deployed from the staging area through the Protected Area under the control of Station Security. The equipment may be deployed through either the South or North Security fence gate through the same routes as described in Phase 2. Communications will be established between the PBNP site and the SAFER team via satellite phones and required equipment will be moved to the site as needed.

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The major NSRC equipment utilized in the Phase 3 strategies for PBNP includes:

- Low Pressure – High Capacity (LPHC) Pump
  The LPHC pump is capable of removing heat from the reactor core in addition to other loads, including the SFP. Ideal flow paths for decay heat removal are to utilize piping in the RHR, CCW and SW systems. The low pressure, high flow pump (1 per unit) provided by the NSRC has a minimum flow capability of 5000 gpm, (using 5 connection points) at a working discharge pressure of 150 psig; these capabilities are similar to an existing PBNP SW pump. The pump is equipped with a 6 inch diameter suction hose rated at 150 psig with standard hose connections (i.e. NH), and a 5 inch diameter discharge hose rated 300 psi with Storz connections. The pump is self-priming and is able to draw 12 ft. suction at sea level. Pump suction is capable of being drawn from a variety of water sources. This pump can take suction from a pressurized source. For PBNP, the suction will be obtained from the CWPH pump bay, forebay or directly from Lake Michigan. The pump discharge will be connected to the SW system by removing the bonnet(s) of 3 of the SW Pump discharge check valves (SW-32A/B/C/D/E/F) and replacing them with a fitting that contains two 5 inch Storz connections. These transitions fittings are stored in the FSB until they are required for a Phase 3 implementation.

- 4.16 kVAC Diesel Generator
  The NSRC will provide medium voltage diesel generators (2 per unit) rated at 4160 VAC and 1 MW. They will be located near the G-03 / G04 DG Building on the north side of the plant at the 28 ft. elevation. Cables from the PDGs will be routed to the G-03/G04 Building and connected at 4160 V Bus 1A-06, Breakers 1A52-77, 1A52-80 or 1A52-86 and 2A-06, Breakers 2A52-90, 2A52-94 or 2A52-95. The justification for utilizing these buses / breakers is documented in EC 278729 (U1) and EC 278730 (U2). Drawings E-11 Sh. 4 and E-2011 Sh. 4 have been revised to identify these locations.

  Both ends of the cables supplied with the PDGs are terminated with two (2) hole lugs, ½ inch diameter, with hole spacing of 1 ¾ inches. Each 4160 VAC cable deployment module accommodates 7 cable reels, two cables for each phase and a neutral cable. No modifications are required to connect to PBNP equipment. There is enough cable for one 4160 VAC Distribution Center and two 4160 VAC generators. Each 4160 VAC cable is 350 feet long. There are three grounds that are connected once the equipment is assembled. Each generator has a neutral ground resistor, and the 4160 V Distribution Center has a safety ground. All three of these are 10 ft. ground cables and each includes a ground rod. Alternatively, they may be connected to the station grounding grid.

3.9. Habitability and Operations

Per the guidance given in NEI 12-06, FLEX strategies must be capable of execution under the adverse conditions (unavailability of installed plant lighting, ventilation, etc.) expected following a BDBEE resulting in an ELAP/LUHS. Hands free battery powered portable lights are available in the Control Room (CR) for performing manual actions and traversing areas of low lighting. Additional battery powered light stands are staged in the PAB, CSR and CR to support operator actions. Primary and backup communication systems are sufficiently independent of one another. The communication system may be powered by a PDG in the event of an ELAP. A satellite phone system is available for communication with offsite emergency response organization. Following a BDBEE and subsequent ELAP event at PBNP, ventilation providing cooling to occupied areas and areas containing FLEX strategy equipment will be lost. The primary concern with regard to ventilation is the heat buildup which occurs with the loss of forced ventilation in areas that continue to have heat loads. A loss of ventilation analysis was performed to quantify the maximum steady state temperatures expected in specific areas related to FLEX implementation to ensure the environmental conditions remain acceptable for personnel habitability and within equipment qualification limits.

3.9.1. Equipment Operating Conditions

Reasonable assurance of equipment operability is based on calculated maximum room temperature less than or equal to 120°F [5.21]. Calculations 2005-0054 [5.62] and 2013-0020 [5.69] were utilized to evaluate the temperature in an ELAP condition. The calculation used outside air temperatures of 105° F which is consistent with the maximum expected outside air temperature of 105.5° F. The calculations determined that room temperatures remained acceptable for equipment operation provided the following actions were initiated:

- Open doors for the TDAFW Pump Room within 2 hours into the event per FSG-4.
- Open doors from PAB Battery and Inverter rooms to the adjoining Control Building within 2 hours of the event per FSG-4.

- Establish ventilation to remove heat from SFP boiling to the environment within 9 hours of the event per FSG-5.

The monitoring of temperature and the opening of additional doors will be controlled in FSG-5.

An additional ventilation concern applicable to Phase 2 is the potential buildup of hydrogen in the battery rooms. Off-gassing of hydrogen from batteries is only a concern when the batteries are charging. If the battery room ventilation is not available, FSG-4 establishes temporary ventilation to address this condition.

3.9.2. Personnel Habitability

The rate of room temperature increase allows responders to access rooms to open doors and monitor and control the room temperature within the acceptable range for personnel habitability. Deployment of fans and load shedding will further accommodate the heat loads in the Control Room which requires long term habitability.

3.10. Water Sources

The primary non-borated water source for providing cooling water flow to the SGs and SFP is the SW pump bay in the CWPH. The CWPH forebay either via direct draft or the standpipe connection and direct draft from Lake Michigan can serve as an alternate water source. These are the same sources used for Phase 3 equipment.

Borated water sources include the RWST or the BAST. Both of these sources are seismically robust. The BASTs are missile protected by the PAB and the RWSTs are surrounded by the plant grade and hardened structures to limit missile damage.

The results of the water source evaluation show that the credited, fully protected, on-site water sources provide for an adequate supplies for SG / RCS, Containment and SFP cooling for all phases of a BDBEE.

3.11. Shutdown and Refueling Analyses

PBNP abides by the Nuclear Energy Institute position paper entitled "Shutdown/Refueling Modes" addressing mitigating strategies in shutdown and refueling modes. This position paper is dated September 18, 2013 and has been endorsed by the NRC staff [5.26 and 5.27].

3.12. Procedures and Training

3.12.1. Procedures

The inability to predict actual plant conditions that require the use of FLEX equipment makes it impossible to provide specific procedural guidance. As such, the FSGs provide guidance that can be employed for a variety of conditions. Clear criteria for entry into FSGs ensures that FLEX strategies are used only as directed for BDBEE conditions, and are not used in lieu of existing procedures. When FLEX equipment is needed to supplement EOPs or Abnormal Operating Procedure (AOP) strategies, the EOP or AOP directs the entry into and exit from the appropriate FSG procedure.

FLEX strategy support guidelines have been developed in accordance with PWROG guidelines. FSGs provide available, pre-planned FLEX strategies for accomplishing specific tasks in the EOPs or AOPs. FSGs are used to supplement (not replace) the existing procedure structure that establishes command and control for the event.

Procedural interfaces have been incorporated into 1(2)ECA-0.0, Loss of All AC Power, and SEP 3.0 Unit 1(2), Loss of All AC Power While on Shutdown Cooling, to the extent necessary to include appropriate reference to FSGs and provide command and control for the ELAP.

FSGs have been reviewed and validated by the involved groups to the extent necessary to ensure the strategy is feasible. Validation was accomplished via walk-throughs or drills of the guidelines and will abide by the guidance provided by NEI. The FSG procedures are maintained by the Operations Department.

3.12.2. Training

NextEra Energy Nuclear Training Program was revised to incorporate FLEX to assure personnel proficiency in the mitigation of BDBEE is adequate and maintained. The training programs were developed and have been implemented in accordance with the Systematic Approach to Training (SAT) Process.

Initial training has been provided and periodic training will be provided to site emergency response leaders on BDB emergency response strategies and implementing guidelines. Personnel assigned to direct the execution of mitigation strategies for BDB external events have received the necessary training to ensure familiarity with the associated tasks, instructions, and mitigating strategy time constraints.

Care has been taken to not give undue weight (in comparison with other training requirements) for Operator training for BDBEE accident mitigation. The testing/evaluation of Operator knowledge and skills in this area have been similarly weighted. Operator training includes familiarity with equipment from the NSRC.

"ANSI/ANS 3.5, Nuclear Power Plant Simulators for use in Operator Training" certification of simulator fidelity is considered to be sufficient for the initial stages of the BDBEE scenario until the current capability of the simulator model is exceeded. Full scope simulator models will not be upgraded to accommodate FLEX training or drills.

Where appropriate, integrated FLEX drills will be organized on a team or crew basis and conducted periodically, with all time-sensitive actions to be evaluated over a period of not more than eight years. It is not required to connect/operate permanently installed equipment during these drills.

4. Technical Evaluation of Order EA-12-051

4.1. Levels of Required Monitoring

Three SFP levels were identified in the Overall Integrated Plan (OIP) for reliable instrumentation [. 5.90]. These consist of the level required for normal Spent Fuel Pool cooling function (60 ft. 9 in.), the level required to provide approximately 10 ft. of water shielding above the fuel (47 ft. 9 inches) and the level where the fuel remains covered (40 ft. 8 in) [5.90].

4.2. Design Features

4.2.1. Instruments

The SFPLI consists of two independent channels of guided wave radar probes that are permanently installed to detect the water level inferred from the reflection of the electromagnetic energy. Instrument design and installation adopts requirements provided in NRC and NEI guidance [5.6 and 5.8]

4.2.2. Arrangement

The SFPLI level instruments are installed in diverse locations near the north and south walls of the SFP to provide reasonable protection against missiles. Detector elevation encompasses the range of water level in the SFP required to be monitored.

The location for the SFP wide range level instrument displays are on the 26 foot elevation of the PAB near the C-59 Waste Disposal Panel. This is approximately 40 feet below the SFP floor. [5.91]

4.2.3. Mounting

The SFP level instrumentation is quality related but incorporates PBNP 2X Safe Shutdown Earthquake (SSE) design requirements [5.91] The pool side bracket has been seismically analyzed and designed to withstand hydrodynamic and sloshing effects [5.91].

4.2.4. Qualification

The SFPLI instrumentation quality and expected reliability has been demonstrated by design, analysis, operating experience and testing with operating and environmental conditions applicable or bounding to the PBNP PAB following an extended loss of all AC power with concurrent loss of SFP cooling and PAB ventilation [5.91].

4.2.5. Independence

The SFPLI primary channel components have been constructed and arranged to be redundant and independent of the backup channel through separation and isolation of sensors, power supplies and cabling.

4.2.6. Power Supplies

The SFPLI channels are powered by separate 120VAC power. The primary level channel is powered from Emergency Lighting Panel 37-E which can be aligned to the Unit 2 Train A backup 1E Emergency power supply via MCC

2B-32. The backup level channel is powered from Emergency Lighting Panel 31-E which is powered from MCC 1B-42 which is fed from 1B-04. [5.91] Battery backup provides at least 72 hours of backup power and a 120 VAC power plug is available to connect a 6 KW portable generator.

4.2.7. Accuracy

The SFPLI accuracy is +/- 3" (~2%) during normal and BDB operating conditions. This is within the channel accuracy requirement of +/- 1 foot required by the Order [5.91].

4.2.8. Testing

Factory Acceptance Testing and On-site Modification Acceptance Testing were performed for function and calibration of the new SFPLI's. Connections and test kits are provided for periodic functional and calibration surveillance procedures that have been established and scheduled.

4.2.9. Display

The SFPLI displays are located in the fully protected structure of the PAB on the 26 ft. near the C-59, Waste Disposal Control Panel. This location is separated from the SFP and will remain habitable during a BDBEE [5.91].

4.3. Programmatic Controls

4.3.1. Training

Training impact resulting from the installation of the SFPLI was reviewed for operations, maintenance, engineering and simulator. Training lesson plans, class scheduling and sessions were completed to implement the results of these reviews [5.91].

4.3.2. Procedures

Operating, maintenance and testing procedures have been developed for SFPLI utilization and reliability [5.91]. The instruments are used in AOP-8F, Loss of Spent Fuel Pool Cooling. FLEX support guideline FSG-5 provides direction for connecting alternate 120 VAC power supplies.

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4.3.3. Testing and Calibration

Site processes have been established to ensure instruments are maintained at their design accuracy [5.91].

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5. References

5.1 FSAR 1.3, General Design Criteria

5.2 PBNP Technical Specification Basis 3.9.6, Refueling Cavity Water Level

5.3 PBNP Technical Specification Surveillance Requirement, SR 3.5.1.2, Accumulators

5.4 SECY-11-0093-Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated July 12, 2011

5.5 EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012 [ML12056A045]

5.6 EA-12-051, Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation [ML12056A044]

5.7 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 Event, dated August 29, 2012 [ML12229A174]

5.8 NEI 12-02, Industry Guidance for Compliance with NRC Order EA 12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1 [ML12240A307]

5.9 NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide [ML12242A318]

5.10 Point Beach Nuclear Plant Tank Level Book, TLB 34, Condensate Storage Tank, Revision 10, dated September 19, 2011

5.11 PBNP Shutdown Emergency Procedure (SEP), SEP-3.0 Unit 1(2), Loss of All AC Power While On Shutdown Cooling

5.12 EDMG-2 , Loss of Large Areas of the Plant Due to Fire or Explosion, Revision 11

5.13 Calculation 2013-13938, FLEX Hydraulic Evaluation of RCS Makeup Using Accumulator Fill Valve SI-835A/B During Modes 5 & 6

5.14 SEP-1 Unit 1(2), Degraded RHR System Capability

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5.15 Point Beach Nuclear Plant Tank Level Book, TLB 1, General Information, Revision 4, dated July 12, 1999

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5.17 Calculation 2013-08213, Hydraulic Analysis of Flow Path for RHR in Mode 5 and 6 During a FLEX Scenario

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5.19 Calculation 2003-0063, Estimate of Time Available to Provide an Alternate Intake Pathway for Lake Water, Revision 0

5.20 Calculation N-94-142, Emergency Diesel Generator, Gas Turbine and Fire Pump Diesel Engine Fuel Oil Systems

5.21 PBNP FSAR Appendix A.1, Station Blackout

5.22 Calculation CN-LIS-14-30, PBNP ELAP Calculations for Boron Mixing Strategy

5.23 Letter from Jack Davis (NRC) to Jack Stringfellow (PWROG), Boron Mixing in Support of PWROG, dated January 8, 2014 [ML13276A183]

5.24 Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG), dated August 16, 2013 [ML13235A135]

5.25 Calculation CN-SEE-II-14-15, PBNP RCS Makeup Boron Evaluation for BDB ELAP Event

5.26 Nuclear Energy Institute (NEI), Position Paper: Shutdown/ Refueling Modes, dated September 18, 2013 [ML13273A514]

5.27 NRC Letter dated September 30, 2013 from Jack R. Davis, Director Mitigating Strategies Directorate, Office of Nuclear Reactor Regulation, NRC Endorsement of the Nuclear Energy Institute (NEI) position paper: Shutdown/Refueling Modes [ML13267A382]

5.28 Calculation 2013-0016, Required RWST Makeup Volume (Support of FSG-8 Attachments)

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5.29 Calculation 2000-0044, Containment Accident Sump Level as a Function of RWST Drain Down, Revision 3

5.30 Letter NRC 2014-0088, NextEra Energy Point Beach, LLC's Expedited Seismic Evaluation Process Report (CEUS Sites), Response NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated December 22, 2014

5.31 PBNP Technical Requirements Manual 3.5.1, Chemical and Volume Control System

5.32 Point Beach Nuclear Plant Internal Memo from Jim Schweitzer to Brad Fromm, WCAP 17601-P, Page 5-120 Gap Action: SG ADV Capacity, dated November 8, 2012

5.33 Calculation PBN-BFJF-13-098, Point Beach Extended Station Blackout Boron Requirements, Revision 1

5.34 Calculation 2013-12974, High Pressure RCS Makeup

5.35 PBNP Final Safety Analysis Report (FSAR) Section 9.9, Spent Fuel Cooling and Filtration

5.36 PBNP Reactor Operating Data (ROD), ROD 1.4, Spent Fuel Pool Heatup Data Unit 1 Cycle 34, Revision 2, dated November 7, 2012

5.37 PBNP ROD 1.4, Spent Fuel Pool Heatup Data Unit 2 Cycle 33, Revision 2, dated November 7, 2012

5.38 Calculation PBN-BFJF-12-230, PB Unit 2 Cycle 32 Reload EC – SFP Decay Heat, Time to 200 F on Loss of Cooling and Time to 6 Inches above Fuel Top Nozzle, Revision 1, dated December 11, 2012

5.39 Calculation 2007-15920, Hydraulic Analysis of Flow Path to the Steam Generator and Containment Spray During a B.5.B Scenario

5.40 Calculation NAI-1761-001 thru -005, Containment Modeling for ELAP

5.41 PBNP Procedure NP 10.3.6, Shutdown Safety Review and Safety Assessment

5.42 PBNP Operations Checklist Unit 1 and Unit 2, CL 1E, Containment Closure Checklist

5.43 PBNP FSAR, Table 14.3.2-2, Large Break LOCA Containment Data Used for Calculation of Containment Pressure

5.44 NRC (E Leeds and M Johnson) Letter to All Power Reactor Licensees et al., Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident, dated March 12, 2012

5.45 EPRI 3002000704, Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1 – Seismic, dated May 2013

5.46 Letter NRC 2013-0024, NextEra Energy Point Beach LLC'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 22, 2013 [ML13053A401]

5.47 PBNP FSAR Section 2.5, Hydrology

5.48 PBNP FSAR Appendix A.7, Flooding

5.49 PBNP Abnormal Operating Procedure, AOP-13C, Severe Weather Conditions

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5.53 PBNP FSAR Section.9.6, Service Water System (SW)

5.54 PBNP FSAR, Appendix D, Diesel Generator Project

5.55 PBNP FSAR Section 2.6, Meteorology

5.56 Design Basis Document DBD-29, Auxiliary Building and Control Building HVAC Design Basis Document, Revision 6, dated February 9, 2009

5.57 Wisconsin Electric Letter VPNPD-95-056, Summary Report on Individual Plant Examination of External Events for Severe Accident Vulnerabilities Point Beach Nuclear Plant, Units 1 and 2, dated June 30, 1995

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5.60 PBNP Technical Specification Basis 3.8.3, Diesel Fuel Oil and Starting Air

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5.63 WCAP-17601-P, Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs, Revision 0

5.64 Calculation 2005-0021, Turbine Driven Auxiliary Feedwater Pump Motive Force, Revision 1

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5.69 Calculation 2013-0020, PAB Scenarios for Fukushima Coping

5.70 NRC Interim Staff Guidance JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0 [ML12221A339]

5.71 PBNP Procedure, ECA 0.0 Unit 1(2), Loss Of All AC Power

5.72 Calculation 2015-04326, Time Required to Switch TDAFW Pump Suction to SW for FLEX

5.73 Calculation 2015-04328, Hydraulic Analysis of Flow Path With the Supply of Lake Water to the SGs via AFW System for FLEX Scenarios

5.74 Calculation M-11165-090-FP.1, Hydraulic Analysis of Flow Path to the Spent Fuel Pool During a B.5.b Scenario

5.75 FPL-076-FHRPR-002, Flooding Hazards Evaluation Report In Response to the 10 CFR 50.54(F) Information Request Regarding Near Term Teak Force Recommendation 2.1 Flooding

5.76 Calculation 2015-07502, Evaluation of Atmospheric Dump Valves, Main Steam Relief Valves and AFW Steam Supply Line for Tornado Missile Effects

5.77 SL-012991, NextEra Energy Point Beach. Tornado Missile Strike Probability for Atmospheric Dump Valves, Main Steam Relief Valves, and AFW Steam Supply Line to Steam Driven Turbine, Revision 0, dated October 2, 2015

5.78 Calculation CN-TA-15-31, Point Beach Uncontrolled Asymmetric Cooldown During ELAP Analysis

5.79 Engineering Change 279879, Attachment 18, Evaluation of the Use of the DDFP for FLEX

5.80 Specification SPEC-M-205, FLEX Steam Generator and Spent Fuel Pool Makeup Pump, Revision 2

5.81 Specification SPEC-E-059, FLEX 480 VAC Trailer Mounted Generator, Revision 2

5.82 VTM 1904, Godwin Low Pressure Pumps

5.83 Engineering Evaluation 2015-0016, LIP Flooding Coping Strategies (Flood Levels) EC 284296

5.84 Letter NRC 2014-0077, NextEra Energy Point Beach LLC's Full Compliance Report for the March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated December 19, 2014

5.85 Letter NRC 2013-0041, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regardinq Recommendation 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Emergency Preparedness - Phase 1 Staffing Assessment, dated April 29, 2013

5.86 Letter NRC 2015-0030, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Emergency Preparedness - Phase 2 Staffing Assessment, dated May 28, 2015

5.87 VTM 1913, Engine Driven High Pressure Fire Pump

5.88 Calculation CN-NO-08-5, Point Beach Units 1 & 2 Appendix R and Main Steam Line Break (MSLB) Cooldown Evaluations to RHR Cut-In Conditions for the 1800 MWt Uprating, Revision 0.

5.89 Calculation 2015-02221, Flow Delivered to TDAFW Pumps Via the DDFP Pump

5.90 Letter NRC 2013-0017, NextEra Energy Point Beach LLC's Overall Integrated Plan in Response to March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 22, 2013

5.91 Letter NRC 2014-0077, NextEra Energy Point Beach LLC's Full Compliance Report for the March 12, 2012 Commission Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated December 19, 2014

POINT BEACH
FLEX FINAL INTEGRATED PLAN

ATTACHMENT A

Sequence of Events Timeline				
Action Item	**Elapsed Time (hours)**	**Action**	**Time Constraint Y/N**	**Action Item**
	0	**Event Starts**	**NA**	Plant @100% power
1	0+	Automatic Reactor/Turbine Trip for both units.	**N**	Loss of all AC will result in an automatic trip.
2	0+	Turbine Driven Auxiliary Feed Water Pump Starts automatically and feeds the Steam Generators	**N**	Automatic Start is generated by an under voltage on A01 and A02.
3	0+	Diesel Fire Pump Automatically starts on a loss of AC power.	**N**	
4	<0.1	Operators perform immediate actions of EOP-0 (Verify Reactor Trip, Verify Turbine Trip and Checking at least 1 Safeguards Bus energized) and then transition to ECA 0.0, Loss of all AC. ECA-0.0 may be entered directly based on indication. ECA-0.0 contains immediate action steps to Verify Reactor Trip and Verify turbine trip.	**N**	EOP-0 contains steps to fast start and load the DGs from the control room.
5	<0.1	RCS inventory loss is minimized by ensuring the major RCS outflow lines that could contribute to rapid depletion of RCS inventory are isolated.	**N**	This is performed in ECA -0.0 Step 4.
6	<0.1	The TDAFW pump is checked at Step 5 of ECA-0.0. Flow is verified at greater than 230 gpm.	**N**	The actual flow at this step is approximately 300 gpm per unit.
7	0.25	Based on Foldout page criteria in ECA-0.0, when CST level decreases to 4 feet (Low-Low Level alarm received in the control room)	**N**	Foldout page criteria are applicable after immediate actions
		Operators are directed to shift to alternate AFW suction source per AOP-23, Establishing Alternate AFW Suction Supply. Reaching the 4 foot level in the CSTs in .25 hours is assuming a missile impacts the CST and drains them to the 6 foot level at T=0.	**N**	are complete. (Steps 1 and 2) AOP-23 would be implemented if an ELAP has not been declared.

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Sequence of Events Timeline				
Action Item	**Elapsed Time (hours)**	**Action**	**Time Constraint Y/N**	**Action Item**
8	0.25	Based on Foldout page criteria in ECA-0.0, when CST level decreases to 4 feet (Low-Low Level alarm received in the control room) and an ELAP in progress the operators are directed to perform FSG-2, Alternate AFW Suction Source. Reaching the 4 foot level in the CSTs in .25 hours is assuming a missile impacts the CST and drains them to the 6 foot level at T=0.	N	FSG 2 will be part of time validation for providing AFW flow to the Steam Generators prior to SG level decreasing to approximately 5 feet.
9	<0.5	Operators determine they are not able to restore AC power from the control room per ECA-0.0.	N	
10	0.5	Shift Manager determines that an ELAP condition exists per ECA-0.0.	Y Level A	
11	0.5	CST level is less than 15.75' and FSG-6 is entered based on foldout page criteria from ECA-0.0.	N	This assumes that the CST level is slightly greater than the low level alarm just prior to the event.
12	1	Start reducing DC loads per FSG-4.	N	
13	1	Vent hydrogen from the main generators per FSG-4.	N	Allows stripping of DC Seal Oil Pump
14	1	Initiate deployment of debris removal equipment per FSG-5.	N	
15	1.75	Establishment of Service water flow to the Turbine driven Auxiliary Feed Water pump via the Diesel Driven Fire pump per FSG-2 prior to steam generator dry out	Y Level A	Based on 6 feet of usable volume in the CSTs. Initial AFW flow is 300gpm per unit and when FSG-2 is entered AFW flow is reduced to 100 gpm per unit.

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Sequence of Events Timeline				
Action Item	**Elapsed Time (hours)**	**Action**	**Time Constraint Y/N**	**Action Item**
16	2	Complete load stripping to conserve battery life per FSG-4. (Includes opening doors for AFP room and battery room ventilation and temperature control.)	Y Level A	Time Constraint to maintain battery supply to critical instruments
17	3	Initiate deployment of portable Charging pumps for RCS makeup and Boration per FSG-5.	N	
18	4	Initiate deployment of 480v diesel generator per FSG-5.	N	This will be a sub-task in support of energizing the battery chargers.
19	4	Deploy PDSG pump and Route hose for backup Steam Generator makeup and SFP makeup at P-9 per FSG-5.	N	
20	5.9	Swap safety related batteries	Y Level A	
21	7	Energize 480 Volt safeguards buses per FSG-5.	N	This will be a sub-task in support of energizing the battery chargers.
22	8	Initiate deployment of fuel oil refueling trailer per FSG-5.	N	This will be guided by the FSG.
23	8	Complete deployment of portable Charging pumps per FSG-5.	N	Portable Charging pumps are required to support cool down of the RCS for makeup. The reactor will not require boration to maintain shutdown margin until after Xe decays to less than full power equilibrium values.

POINT BEACH
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ATTACHMENT A

Sequence of Events Timeline				
Action Item	**Elapsed Time (hours)**	**Action**	**Time Constraint Y/N**	**Action Item**
24	8	Energize the required station battery chargers and align to the batteries per FSG-4.	Y Level A Actions to complete this will start prior to 6 hours	Time Constraint to have battery chargers energized and aligned prior to battery depletion.
25	8	Initiate RCS boration if both steam generators are not available for a RCS cool down per FSG-8.	N	Cool down would have to be delayed until boric acid is injected and allowed 1 additional hour for mixing.
26	9	Install nozzles and route hoses from SFP refueling deck to the 8 foot elevation of the PAB per FSG-5. Open doors on the 66' elevation of the PAB to establish ventilation flow path in anticipation of SFP boiling per FSG-5.	Y Level B	Time Constraint to have completed prior to SFP reaching 200oF.
27	9	Monitor vital area room temperatures- Computer Room, Cable Spreading Room, Vital Switchgear Room, Control Room, AFW room, and PAB White and Yellow inverter rooms, and open doors as necessary per FSG-4 and FSG-5	N	
28	11	Spent Fuel Pool Boils Assuming full core off load (Rod 1.4).	N	Spent Fuel Pool temperature is monitored per ECA-0.0
29	12	Refuel Diesel Driven 480v generator, communications generator and commence refueling schedule for all portable equipment per FSG-5.	Y Level B	Time Constraint based on Fuel Oil Consumption of Diesel Driven 480v generator and the 6Kw generator for communications.

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ATTACHMENT A

Sequence of Events Timeline				
Action Item	**Elapsed Time (hours)**	**Action**	**Time Constraint Y/N**	**Action Item**
30	12	Commence RCS Cool down to desired temperature and Pressure per ECA-0.0. Initiating a cool down at 12 hours assumes both steam generators are available for a symmetric cool down of the Reactor coolant system.	N	Not a Time Constraint based on installation of low leakage Reactor Coolant Pump seals.
31	12	Commence Boric acid / inventory additions to the RCS per FSG-8 and or FSG-1. Boric Acid addition may commence earlier based on RCS volume available.	N	Not a Time Constraint but needed to support cool down.
32	13	Isolate SI Accumulators per FSG-10.	N	Complete prior to Steam Generator pressure of 320 psig.
33	15	Commence RCS Cool down to desired temperature and Pressure per ECA-0.0 if both Steam generators are not available for RCS cool down.	N	Starting an Asymmetric cool down at 15 hours allows for 6 hours of boration and 1 hour of additional time for mixing.
34	36	Initiate makeup to SFP	Y Level C	SFP level would reach 2' 11" at approximately 75 hours into the event.
35	72	Receive RRC 4160V portable Diesel Generators and initiate plant system(S) recovery	N	

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ATTACHMENT A

Items validated from the Sequence of Events Timeline:

Action Item	Elapsed Time (hours)	Action	Level of Validation (A,B,C,N/A)	Remarks/Applicability
	0	Event Starts	NA	Plant @ 100% power
10	0.5	Shift manager Declares an ELAP per ECA-0.0.	Level A	An ELAP has to be declared to enter the FSGs
15	1.75	Establish Diesel Fire Pump supply to AFW per FSF-2	Level A	
16	2	Complete DC Load shedding per FSG-4.	Level A	DC Load calculations assume load shedding is complete at 2 hours into the event.
20	4.5	Swap Safety related batteries per FSG-4	Level A	
24	8	Energize the required station battery chargers and align to the batteries per FSG-4.	Level A	Level A Validation since this needs to start prior to T+6
26	9	Install nozzles and route hoses from SFP refueling deck to the 8 foot elevation of the PAB per FSG-5.	Level B	Time constraint to have completed prior to SFP reaching 200 degrees F.
29	12	Commence refueling schedule for all portable equipment per FSG-5.	Level B	
34	24	Initiate makeup to SFP	Level C	

POINT BEACH
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ATTACHMENT A

Additional items validated:

Related Action Item	Elapsed Time (hours)	Action	Level of Validation (A,B,C,N/A)	Remarks/Applicability
N/A	If unit specific AFW pump fails	Align Opposite Unit Steam Driven AFW Pump per FSG-15	Level A	Only needed if the Unit specific AFW pump fails.
11		Provide makeup to the CSTs per FSG-6	Level A	
N/A	N/A	Provide makeup to the RCS while in mode 5 and 6	Level A	