Exelon Generation®

Order No. EA-12-049

RS-15-218

August 28, 2015

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

R. E. Ginna Nuclear Power Plant
Renewed Facility Operating License No. DPR-18
NRC Docket No. 50-244

Subject: 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)

References:

1. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
4. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), 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
5. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013
6. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Supplement to 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 March 8, 2013
7. Letter from E. D. Dean (CENG) to Document Control Desk (NRC), R. E. Ginna Nuclear Power Plant - Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for

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Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 27, 2013

8. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC) – February 2014 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 27, 2014 (FLL-14-004)
9. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC) – August 2014 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 26, 2014 (FLL-14-029)
10. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC) – February 2015 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 20, 2015 (RS-15-061)
11. Letter from J. S. Bowen (NRC) to M. G. Korsnick (CENG), R. E. Ginna Nuclear Power Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049, (Mitigation Strategies) (TAC No. MF1152), dated February 19, 2014
12. Letter from J. P. Boska (NRC) to J. E. Pacher (EGC), R. E. Ginna Nuclear Power Plant – Report for the Onsite Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (TAC Nos. MF1152 and MF1147), dated June 18, 2015

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

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the EGC initial status report regarding mitigation strategies. References 5 and 6 provided the R. E. Ginna Nuclear Power Plant overall integrated plan.

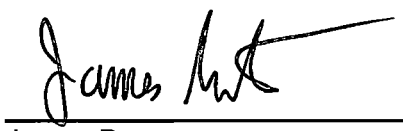
Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. References 7, 8, 9, and 10 provided the first, second, third, and fourth six-month status reports, respectively, pursuant to Section IV, Condition C.2, of Reference 1 for R. E. Ginna Nuclear Power Plant. The purpose of this letter is to provide the fifth six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosed report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any. The enclosed report also

addresses the NRC Interim Staff Evaluation Open and Confirmatory Items contained Reference 11, and any NRC Audit Report open items contained in Reference 12.

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of August 2015.

Respectfully submitted,



James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

R. E. Ginna Nuclear Power Plant Fifth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator - Region I
NRC Senior Resident Inspector – R. E. Ginna Nuclear Power Plant
NRC Project Manager, NRR – R. E. Ginna Nuclear Power Plant
Ms. Jessica A. Kratchman, NRR/JLD/JPSB, NRC
Mr. Jeremy S. Bowen, NRR/JLD/JOMB, NRC
Mr. John P. Boska, NRR/JLD/JOMB, NRC

Enclosure

R. E. Ginna Nuclear Power Plant

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

(57 pages)

ENCLOSURE
R. E. GINNA NUCLEAR POWER PLANT
FIFTH SIX-MONTH STATUS REPORT FOR THE IMPLEMENTATION OF ORDER EA-12-049, ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS

1 Introduction

The R.E. Ginna Nuclear Power Plant, LLC (Ginna) Overall Integrated Plan (OIP) was submitted to the Nuclear Regulatory Commission (NRC) in February 2013 (Reference 1), documenting the diverse and flexible strategies (FLEX), in response to NRC Order Number EA-12-049 (Reference 2). Subsequently, a supplement to the Ginna OIP for FLEX was submitted to the NRC in March 2013 (Reference 3). This enclosure provides an update of milestone accomplishments since submittal of the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and associated basis.

Since submittal of the last status report in February 2015 (Reference 4), Ginna FLEX strategy implementation has progressed with engineering analyses, calculations, and construction that support the mitigation strategies.

2 Milestone Accomplishments

The following milestone(s) have been completed since submittal of the last status report in February 2015 (Reference 4) and are current as of July 28, 2015.

- The strategies/contract with the National SAFER Response Center has been developed.
- The training plan has been developed.
- The onsite and augmented staffing assessment considering functions related to Near-Term Task Force (NTTF) Recommendation 4.2 has been submitted to the NRC.

3 Milestone Schedule Status

Table 1 provides an update to Attachment 2 of the Ginna OIP (Attachment 1 - References 1 and 3). It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

ENCLOSURE
R. E. GINNA NUCLEAR POWER PLANT
FIFTH SIX-MONTH STATUS REPORT FOR THE IMPLEMENTATION OF ORDER EA-12-049, ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS

Table 1
Status of Ginna FLEX OIP Milestones

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Commence Engineering and Design	July 2013	Started	September 2015*
Commence Procurement of Equipment	July 2013	Started	September 2015
Commence Installation of Equipment	July 2013	Started	November 2015
Submit 6-Month Status Report	August 2013	Complete	
Develop Strategies/Contract with the National SAFER Response Center	November 2013	Complete	July 2015*
Submit 6-Month Status Report	February 2014	Complete	
Complete Engineering and Design	March 2014	Started	September 2015*
Create Maintenance and Testing Procedures	June 2014	Started	October 2015
Submit 6-Month Status Report	August 2014	Complete	
Procedure Changes Training Material Complete	September 2014	Started	September 2015*
Develop Training Plan	November 2014	Complete	July 2015
Submit 6-Month Status Report	February 2015	Complete	
Issue FLEX Support Guidelines	April 2015	Started	November 2015
Perform Walk-throughs or Demonstrations	May 2015	Started	September 2015*
Provide onsite and augmented staffing assessment considering functions related to Near-Term Task Force (NTTF) Recommendation 4.2.	May 2015	Complete	June 2015*
Implement Training	June 2015	Started	November 2015
Submit 6-Month Status Report	August 2015	Complete with this submittal	
Complete Procurement of Equipment	September 2015	Started	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Full compliance with EA-12-049 is achieved	Fall 2015	Started	
Submit Completion Report	December 2015	Not Started	January 2016*

* Change since submittal of last six month status report.

4 Changes to Compliance Method

The following is a list of the coping strategies that have been changed since the last six month status report with an explanation of the changes. Additional details on how Ginna's OIP complies with the guidance in NEI 12-06 (Reference 5) are also provided:

a) FLEX equipment connections will be protected against external hazards. Ginna will locate all FLEX connections in seismically robust structures (SC-1 or evaluated otherwise). In addition, any areas that plant operators will require access to deploy, or control the capability; will be located in, or on the exterior of, seismically robust structures. The following structures, which will be utilized during FLEX implementation, are Safety Related, Seismic Category 1 Structures per UFSAR Table 3.2-1 (Reference 6):

- Containment
- Auxiliary Building
- Control Building
- Intermediate Building
- Standby Auxiliary Feed Water Building
- Diesel Generator Building

The following structures, which will be utilized during FLEX implementation, are non-safety related; however, they are considered seismically robust for the following reasons:

- Turbine Building - per footnote "j" of UFSAR Table 3.2-1, the Turbine Building was analyzed during the SEP and it was determined that the building could meet Seismic Category 1 requirements without failure. Those portions of the building required to maintain its overall structural integrity are now considered Seismic Category 1.
- Standby Auxiliary Feedwater Annex and Associated Concrete Pad - the concrete pad and associated enclosure building are designed using the safe-shutdown earthquake as a design input. The structure is designed to withstand SSE loads.

The event which causes flooding at Ginna is caused by extreme regional precipitation which has days of warning time associated with it (NEI 12-06 Table 6-1). The Ginna Battery Charger connections, RCS connections, and Auxiliary Feedwater Connections will be protected from the design basis flood.

Safety Function	Method	Connection	External Hazard Protection	Procedure(s) Drawings
Core Cooling (P)	SAFW Pump Powered from SAFW D/G Located in SAFW Building/SAFW Annex	One SAFW Pump (two available) can supply its respective S/G or both S/Gs via a cross connect valve. Suction is from the SAFW DI Storage Water Tank.	Seismic, Tornado, Flooding	ATT-5.5 Attachment SAFW With Suction From DI Water Storage During SBO (Ref. 7) Dwg. 33013-1238 Standby Aux Feedwater P&ID (Ref. 8)
Core Cooling (P)	Diesel Driven FLEX pump located in SAFW Annex Hoses stored in Portable Trailers +1 pump stored in "L" Building	Used to refill SAFW DI Water Storage Tank. FLEX Pump and Hose Trailer are moved to west of Screenhouse with suction for pump from Lake Ontario. Discharge hoses are run up east side roadway to distribution manifold then from manifold to V-9782 (located in SAFW Annex). In addition, manifold allows branch lines to be laid into Auxiliary Building (AB) to fill SFP.	Seismic, Tornado (Protected from, but not available or needed during Flood)	FSG-6 Alternate SAFW DI Water Storage Tank Makeup (Ref. 9) Dwg. 33013-1238 (Ref. 8)

Safety Function	Method	Connection	External Hazard Protection	Procedure(s) Drawings
Core Cooling (A)	Diesel Driven FLEX Pump located in SAFW Annex along with suction and discharge hoses.	Located in SAFW Annex and connect to SAFW cross connect line in SAFW Building. Suction is from SAFW DI Storage Water Tank or Lake Ontario. Pump is moved into position outside SAFW Annex. Suction hose is connected to fitting at V-9772 at base of tank. Discharge hose is run into SAFW Annex, through door 63 to V-9757 (to be installed) on discharge cross-tie line for SAFW Pumps.	Seismic, Tornado (Protected from, but not available or needed during Flood)	FSG-3 Alternate Low Pressure Feedwater (Ref. 10) Dwg. 33013-1238 (Ref. 8)
RCS Makeup (P)	Alternate RCS Injection from motor driven pump powered by SAFW D/G Located in SAFW Building	Supplied from RWST with discharge to either or both SI lines. Piping transitions from AB Basement / Middle Level to SAFW Annex to SAFW Pump Room. Valves / piping / Power supply located inside protected structures.	Seismic, Tornado, Flood	FSG-1 Long Term RCS Inventory Control (Ref. 11) FSG-8 Alternate RCS Injection (Ref. 12) Engineering Change Notice ECP-14-000169-CN-090 Alternate Charging System (Ref. 13) Dwg. 33013-1230 Alternate Charging System (Ref. 44)

Safety Function	Method	Connection	External Hazard Protection	Procedure(s) Drawings
RCS Makeup (A)	Alternate RCS Injection diesel driven pump relocated from the "L" Building to east of the SAFW Building near door #99.	Connectable to the alternate RCS injection suction and discharge lines penetrating wall near door #99 to take suction from the RWST and discharge to either or both SI lines.	Seismic, Tornado (Protected from, but not available or needed during Flood)	FSG-1 (Ref. 11) FSG-8 (Ref. 12) ECP-14-000169-CN-090 (Ref. 13) Dwg. 33013-1230 (Ref. 44)
SFP Makeup (P)	Diesel Driven FLEX pump located in SAFW Annex Hoses stored in Portable Trailers +1 pump stored in "L" Building	FLEX Pump and Hose Trailer are moved to west of Screenhouse with suction for pump from Lake Ontario. Discharge hose is run up east side roadway to distribution manifold. From distribution manifold hose can be run to the edge of SFP and tied down.	Seismic (While the AB Operating Floor is not protected from a Tornado, access to the SFP is still expected to be available.) (Protected from, but not available or needed during Flood)	FSG-11 Alternate SFP Makeup and Cooling (Ref. 14) Dwg. 33013-1248 Auxiliary Cooling Spent Fuel Pool Cooling P&ID (Ref. 15)
SFP Makeup (A)	Diesel Driven FLEX pump located in SAFW Annex Hoses stored in Portable Trailers +1 pump stored in "L" Building	FLEX Pump and Hose Trailer are moved to west of Screenhouse with suction for pump from Lake Ontario. Discharge hose is run up east side roadway to distribution manifold. From distribution manifold hose can be run to the Blitz fire nozzles located within 75 ft. of SFP.	Seismic (While the AB Operating Floor is not protected from a Tornado, access to the SFP is still expected to be available.) (Protected from, but not available or needed during Flood)	FSG-11 (Ref. 14) Dwg. 33013-1248 (Ref. 15)

Safety Function	Method	Connection	External Hazard Protection	Procedure(s) Drawings
SFP Makeup (A)	Diesel Driven FLEX pump Located in SAFW Annex Hoses stored in Portable Trailers +1 pump stored in "L" Building	FLEX Pump and Hose Trailer are moved to west of Screenhouse with suction for pump from Lake Ontario. Discharge hose is run up east side roadway to distribution manifold. From distribution manifold hose can be run to the flanged connection point at V-8662 in the SFP Cooling system located in the AB Basement.	Seismic, Tornado (Protected from, but not available or needed during Flood)	FSG-11 (Ref. 14) Dwg. 33013-1248 (Ref. 15)
Battery Chargers (P)	SAFW D/G is used to power Battery Chargers A & B through "protected connection points" in the SAFW Annex and AB using installed junction boxes with cables that are stored in the Waste Gas Compressor Room (AB Middle Level)	Fed from SAFW D/G through ACPDPAF07. Cable run from Junction Box "A" to Junction Box "B" all located in SAFW Annex. Transition to "9 Box" in AB Middle level via conduit (hard wired) to Waste Gas Compressor Room. Cable run from "9 Box" to MCC C and MCC D to feeder breakers for Battery Chargers A & B.	Seismic, Flood	FSG-4 ELAP DC Bus Load Shed/Management (Ref. 16) Dwg. 33013-3131 480 VAC Single Line Diagram SAFW & NFPA805 1000KW Standby Diesel Generator Sets (Ref. 17) Dwg. 33013-2539 AC System Plant Load Distribution One Line Wiring Diagram (Ref. 18)

Safety Function	Method	Connection	External Hazard Protection	Procedure(s) Drawings
Battery Chargers (P)	SAFW D/G is used to power Battery Charger B through "protected connection points" in the SAFW Annex and AB using installed junction boxes with cables that are stored in the SAFW Annex and AB; and to power Battery Charger A through "protected connection points in Battery Room "A" using cables that are stored in the Waste Gas Compressor Room (AB Middle Level)	Fed from SAFW D/G through ACPDPAF07. Cable run from Junction Box "A" to Junction Box "B" all located in SAFW Annex. Transition to "9 Box" in AB Middle level via conduit (hard wired) to Waste Gas Compressor Room. Cable run from "9 Box" to MCC D to feeder breakers for 'B' Battery Chargers. In lieu of powering MCC C, cable is run from the SAFW Annex through Door 63 and 99 outside to TSC Hallway Door and down to Battery Room "A" with connection made directly to battery charger.	Tornado	FSG-4 (Ref. 16) Dwg. 33013-3131 (Ref. 17) Dwg. 33013-2539 (Ref. 18)
Battery Chargers (A)	100KW D/G relocated from "L" Building to outside the SAFW Annex overhead door is used to power Battery Chargers A & B through "protected connection points" in the SAFW Annex and AB, using installed junction boxes with cables that are stored in the Northeast Sea Land.	Fed from 100 KW D/G by cable run from 100 KW D/G to Junction Box "B" located in SAFW Annex. Transition to "9 Box" in AB Middle level via conduit (hard wired) to Waste Gas Compressor Room. Cable run from "9 Box" to MCC C and MCC D to feeder breakers for Battery Chargers A & B.	Seismic (Protected from, but not available or needed during Flood)	FSG-4 (Ref. 16) Dwg. 33013-3131 (Ref. 17) Dwg. 33013-2539 (Ref. 18)

Safety Function	Method	Connection	External Hazard Protection	Procedure(s) Drawings
Battery Chargers (A)	100 KW D/G relocated from "L" Building to the east outside entrance to the TSC is used to power Battery Chargers A & B through "protected connection points" in the Battery Rooms, using cables that are stored in the Northeast Sea Land.	Fed from 100 KW D/G by cables run from 100 KW D/G to portable FLEX Junction box and then lay out cables from the Junction Box to the selected battery charger(s) in the associated Battery Room.	Tornado (Protected from, but not available or needed during Flood)	FSG-4 (Ref. 16) Dwg. 33013-3131 (Ref. 17) Dwg. 33013-2539 (Ref. 18)

b) Regarding deployment of portable equipment during flooding: ER-SC.2, "High Water (Flood) Plan," (Reference 19) identifies two severity levels that exist with respect to external flooding: Level 1 and Level 2. The symptoms or triggers that initiate a Level 1 flooding condition are as follows: (1) 5 inches of rain over a 24-hour period forecasted in the next 3 days; (2) Shift Manager discretion. The symptoms that initiate a Level 2 flooding condition are as follows: (1) Forecasted rainfall of 10 inches or more within the next 24 hours; (2) Lake level rises to a level of 252 ft., as noted in the discharge canal and a continued rise is observed or expected; (3) Flooding of Deer Creek reaches access road bridge handrail; (4) Wave action causes water splashing over discharge canal wall OR pushes water over the armor stone; (5) Flooding of the Screen House or Turbine Building Basement; (6) Shift Manager discretion.

Per ER-SC.2, during a Level 1 flooding condition, personnel are dispatched to place FLEX dewatering pumps in the following areas: Auxiliary Building/RHR Subbasement; inside engineered barriers in the Turbine Building Basement near Emergency D/G Rooms; and inside engineered barriers in the Turbine Building Basement near the Battery Rooms. Additionally, in accordance with ER-SC.2, personnel are to stage a 100KW portable FLEX D/G (KBD01A) on the Turbine Building Operating Floor as a source of power for the FLEX dewatering pumps. It should be noted that these are contingency actions and are not credited as FLEX strategies. Credited FLEX equipment consists of the doors and seals of the Battery Rooms, Air Handling Room, and the Diesel Generator Rooms. No flooding of the Auxiliary Building is anticipated during the Probable Maximum Flood.

As previously stated, KBD01A is used as a source of power for the FLEX dewatering pumps. Details related to fuel consumption of KBD01A are documented in DA-ME-14-003, "Fukushima Fuel Consumption Analysis," (Reference 20). Table 2 of this analysis concludes that it would take approximately 12.1 hours for KBD01A to deplete its fuel

tank (conservatively assuming an initial fuel oil level of 55% at the beginning of the event). According to DA-ME-15-006, "Fukushima Timeline Analysis," (Reference 21) the flooding event only has a persistence of 10 hours; as a result, a sufficient amount of fuel oil exists within KBD01A to operate throughout the duration of the flood. Should refueling be required, STP-O-40.2, "Diesel Driven FLEX Generator Periodic/Annual Load Bank Test," Attachment 4, (Reference 22) provides guidance for refueling KBD01A utilizing two FLEX Fuel Tank Trailers. Each fuel tank trailer contains 990 gallons of diesel fuel. For added conservatism, these tanks were not credited for use in DA-ME-14-003. Per ER-SC.2, during a Level 1 flooding condition, personnel are dispatched to fill the Diesel Fuel Truck and Fuel Trailers with Diesel Fuel and Stage at high ground onsite. As a result, approximately 1,980 gallons of non-utilized diesel fuel would be available for refueling KBD01A if required.

With respect to core cooling, the SAFW pumps are credited FLEX components, as outlined in DA-ME-15-006. Consequently, ER-SC.2 Steps 6.2.8 and 6.3.8, require Operations to evaluate if city water should be aligned to the SAFW pumps during Level 1 and Level 2 flooding conditions. It should be noted that the SAFW DI Water Storage Tank is the credited source of water for the SAFW pumps. Similarly, the SAFW pumps are credited for core cooling during a tornado event. The installation of ECP-14-000749, "SAFW AB Cross Tie (Fukushima)," (Reference 23) will ensure the capability to provide flow to both Steam Generators from either SAFW pump.

c) Connection points for portable equipment remain viable for flooded conditions as specified in NEI 12-06, Section 6.2.3.2, Consideration 5. With respect to core cooling, the SAFW pumps are credited FLEX components (DA-ME-15-006, Reference 21). Prior to flooding conditions an operator will be staged in the SAFW Building to operate the SAFW Pump as needed. It should be noted that the credited source of water during a beyond design basis external flooding event is the SAFW DI Water Storage Tank (TCD05). Neither the DI Water Storage Tank nor the SAFW Pumps are impacted by an external flood. In the event that both SAFW Pumps and both Fukushima/NFPA Diesel Generators (KDG08 and KDG09) fail, a portable FLEX pump could be installed to provide flow directly to the Steam Generators. This is considered an N+1 scenario and as a result is not time critical. Therefore, an adequate amount of time would have elapsed following the event such that floodwaters would have receded and debris would be removed prior to installing a portable FLEX pump.

There is no adverse change to the alternate Residual Heat Removal (RHR) strategy during an external flooding scenario. All equipment utilized for alternate RHR is located in the Auxiliary Building Subbasement, which is not impacted by an external flood. Similarly, the connection points and equipment deployment areas to supply Lake Ontario water to an RHR Heat Exchanger are not impacted by an external flooding event. Considering floodwaters recede within 10 hours of the event and NSRC equipment does not arrive for 24 hours following the event, adequate time would be available to remove

debris from equipment deployment areas and connection points prior to equipment arrival and installment.

There are no adverse impacts to secondary water inventory strategies as a result of flooding. The DI Water Storage Tank which is utilized for the first portion of the event has approximately 24 hours of inventory. Due to the fact that floodwaters will recede within 10 hours of the event, adequate time remains to align the ultimate heat sink for infinite makeup capability using one of three portable FLEX pumps.

Per DA-ME-15-006, all equipment responsible for RCS makeup and the associated connection points are protected during a beyond design basis external flooding event.

To maintain Containment integrity during ELAP conditions, long term cooling will be established using NSRC equipment. This equipment shall provide flow to the Containment Recirculation Fan Coolers (CRFCs) through Service Water (SW) connection points located in the Intermediate Building Basement. While the Intermediate Building Basement is subject to flooding, Containment cooling is not needed for at least 36 hours, which is well past the 10 hour flood duration.

Spent Fuel Pool (SFP) makeup will be accomplished using a portable FLEX pump with water supplied from Lake Ontario. Two connection points for SFP makeup exist: at the pool (provided that radiation levels are within limits) and in the basement of the Auxiliary Building. Since SFP makeup is not required until at least 21 hours after the event and floodwaters recede within 10 hours of the event, neither of these connection points are impacted by external flooding conditions.

The FSGs do not necessarily differentiate between connection points (i.e., FLEX Tornado Connection Point versus FLEX Flooding Connection Point). There are redundant connection points that can be utilized for multiple beyond design basis scenarios. Both protected and accessible connection points exist for all beyond design basis external events.

d) FLEX equipment can operate under extreme hot and cold temperatures. Flex Pumps (Three) and the Flex 100 KW Diesel Generator are all equipped with engine block heaters and battery tenders. Two Pump units and the 100 KW D/G are stored in a commercial structure with the 3rd Flex Pump stored in a robust structure (SAFW Annex) that is protected from floods, tornados, and earthquakes. The SAFW Annex is temperature controlled as well.

For the 100 KW D/G the design temperature specifications for the control unit indicate a range of minus 40°F to 158°F with an Engine Derate indicated for ambient temperatures greater than 122°F. This temperature range bounds those experienced at Ginna.

For the Flex Pump engine there is no max ambient temperature indicated in the specifications. Only if the operating (coolant) temperature indicates greater than 234°F is it recommended that load be reduced on the engine. For cold weather concerns a block heater is recommended for temperatures down to 0°F, which is currently used.

e) WCAP-17601, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs," (Reference 24) was reviewed and the guidance utilized to assist with development of the OIP. WCAP-17601 Section 3.1 'Westinghouse' provides 10 recommendations for consideration in developing the FLEX mitigation strategies. Ginna's positions on these recommendations are as follows:

- The recommendation to minimize RCP seal leakage rates is applicable to Ginna. The ELAP mitigation strategy will utilize the ECA-0.0, "Loss of All AC Power," (Reference 25) guidance to direct a cooldown of the RCS early in the event to reduce RCP seal leakage. Symmetric RCS cooldown will be performed utilizing both steam generators for RCP seal package temperature considerations.
- The recommendation to develop inventory coping times beyond the reference case by installing low leakage RCP seals was evaluated by Ginna, but will not be implemented due to the 10 CFR Part 21 issue that was identified by Westinghouse for their low leakage seals. As documented in WCAP-17601 Section 5.3.1.6, Ginna has the added benefit of coping time with its Model 93 RCPs (ME-343, "Equipment Specification for New Westinghouse Model 93 Reactor Coolant Pump Internals," Reference 26) due to the leak donor locations being significantly elevated with respect to the Model 93A RCPs.
- Regarding the WCAP-17601 high level list of instrumentation for the RCS, in order to confirm / maintain adequate core cooling, Ginna is crediting instrumentation that has been previously evaluated as acceptable for coping with seismic, flooding, tornados, and loss of AC power events and are part of Ginna's current licensing basis. These instruments are described in the OIP and meet the NEI 12-06 guidance for PWR instrumentation in Section 3.2.1.10. These instruments support the key actions identified in plant procedures and/or guidance. This approach was accepted in the R. E. Ginna Nuclear Power Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Reference 27), Section 3.2.1.5, Monitoring Instrumentation and Controls. FSG-7, "Loss of Vital Instrumentation or Control Power," (Reference 28) provides actions to establish alternate monitoring and control capabilities.
- The recommendation for maintaining a subcritical condition in the reactor core is applicable to Ginna. FLEX specific cycle generated curves will not be used for maintaining subcritical conditions. To supplement the existing cycle specific curves, bounding actions to maintain subcritical conditions will be implemented in procedures. CALC-2014-0002, "Cycle 38 Reactor Engineering Calculations," (Reference 29) adds a new Section 8.23 and Attachment 11 for FLEX Boration Strategies. Depending on the scenario evaluated, a 40% or 15% uncertainty was

applied to bound the calculation for elevated boron concentrations that may be applicable to future core designs. Since makeup to the RCS will be required to maintain adequate inventory for natural circulation cooling, expectations are that the borated makeup strategy will provide adequate shutdown margin (Keff less than 0.99) for the realistic conditions and assumptions cited in WCAP-17601. For additional information see the response to audit question 3.2.1.8.A.

- The recommendation to supply 40 gpm of RCS makeup at 1500 psia is applicable to Ginna. A modification is in progress to provide makeup capability of 75 gpm at 1500 psig. Makeup will be initiated prior to the transition from two-phase natural circulation to reflux boiling and with sufficient time to maintain shutdown margin with an hour margin for natural circulation conditions. For additional information see the response to ISE Confirmatory Item 3.2.1.8.A.
- As stated under recommendation 2 above, the recommendation to install low leakage seals was evaluated by Ginna but will not be implemented due to the 10 CFR Part 21 issue that was identified for the Westinghouse low leakage seal design.
- The recommendation to consider the prioritization of pre-staging a FLEX strategy for alternate feedwater additions, when time and resources permit, is applicable to Ginna. The primary FLEX strategy for alternate feedwater additions relies upon a SAFW pump powered by the SAFW D/G, which is an approved alternative in the R. E. Ginna Nuclear Power Plant – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Reference 27). In addition, the alternate strategy for feedwater addition relies upon one portable diesel driven FLEX pump and associated hoses stored in the new SAFW Annex (robust structure) capable of feeding the steam generators. Deployment will involve hooking up the suction and discharge hoses to the new condensate storage tank and AFW lines respectively, which are in close proximity to the portable diesel driven pump, and then perform the valve alignment, start the pump, and begin feeding. To prevent S/G overfill when the TDAFW pump is available, ECA-0.0 (Reference 25) directs the operators to monitor intact S/G levels and when narrow range level is GREATER THAN 7% [25% adverse CNMT] and to control AFW by throttling TDAFW flow control valves, or by throttling TDAFW pump discharge MOV-3996, or by locally throttling TDAFW flow control valves, or by starting and stopping the TDAFW pump.
- The recommendation to have a low pressure portable feedwater system capable of feeding the steam generators is applicable to Ginna. Ginna's flow and pressure requirements differ from the generic numbers provided in the recommendation, but it is noted that the recommended requirements may vary from one plant to another. The flow and pressure applicable to Ginna, which is stated in the Overall Integrated Plan, is 215 gpm and 260 psig. The pressure value is based on the ECA-0.0 Appendix A (Reference 25) direction to cooldown the RCS when establishing low pressure S/G feed by reducing steam generator pressure to 260 psig; and the flow value is based on the design flow for a SAFW pump, which meets decay heat removal requirements. As stated under recommendation 1 above, symmetric RCS

cooldown will be performed utilizing both steam generators for RCP seal package temperature considerations.

- The recommendation to evaluate the strategy for accumulator makeup capability and isolation / venting to prevent gas injection is applicable to Ginna. See the response to ISE Confirmatory Item 3.2.1.A. Boration requirements have been determined and are discussed under recommendation 4 above, in response to ISE Confirmatory Item 3.2.1.8.A, and will be implemented in procedures ECA-0.0 (Reference 25) and FSG - 1, "Long Term RCS Inventory Control," (Reference 11).
- The recommendation to consider the prioritization of staging portable equipment that may be required to isolate/vent the accumulators when certain cooldown maneuvers are necessitated is applicable to Ginna. This will be addressed in the response to ISE Confirmatory Item 3.2.1.B.

f) Analyses of multiple plant areas have been completed to evaluate the effects of loss of heating ventilating and air conditioning (HVAC) during an ELAP event. RWA-1433-001, "Ginna Standby Auxiliary Feedwater Room Heat-Up Analysis", (Reference 30) documents the SAFW Building and SAFW Annex temperature response for HELBs, Appendix R cases, and Fukushima/FLEX cases. The calculation includes assessment of temperatures of key components within the SAFW building. SAFW ventilation is established under ATT-5.5, "Attachment SAFW with Suction from DI Water Storage Tank During SBO" (Reference 7). SAFW pumps depend on ambient cooling such that ventilation is adequate to ensure temperatures are acceptable. The new permanent RCS Injection pump in the SAFW Building will depend on ambient cooling. The selected pump motor has Type H insulation such that it is qualified for well beyond predicted room temperatures for thousands of hours.

ECP-13-000975-015-7B-01, "Design Change Technical Evaluation," (Reference 31) documented acceptable SAFW Annex D/G air system flow resistance to satisfy radiator flow requirements. RWA-1433-001 modeled ventilation for the Annex D/G. Case 6 simulated FLEX conditions. The analysis outputs were provided as maximum temperatures for different room elevations. Annex D/G temperature constraints are satisfied by comparison of ECP-13-000975-015-7B-01 requirements against RWA-1433-001 predictions. One temperature of potential interest is the engine air intake. ECP-13-000975-015-7B-01 documents the engine will derate if the air intake temperature exceeds 122°F. The GOTHIC analysis identifies a max air temperature of 123°F below 10 ft. elevation (air intakes are at approximately 7 foot elevation). The engine air intake temperature is expected to be significantly less than the max prediction of 123°F given the location of the engine air intakes in the room air flow. The engine air intakes are upstream of the engine and face the incoming outside air such that the engine intake air is not expected to be heated significantly.

Specific FLEX analyses of Battery Room ventilation needs were not performed. Ventilation for the Battery Rooms is established under FSG-4 (Reference 16). Small

portable heating/cooling units for the Battery Rooms are expected to be sized and procured prior to the 2015 Ginna Refueling Outage.

Also see response to ISE Confirmatory Item 3.2.4.2.A.

g) Electrical isolations and interactions are addressed as follows: The FLEX Generators (Fixed and Portable) will initially be connected to a dead bus and will be isolated from the bus. Other sources of power to that bus will be verified to be unavailable and de-energized. This will preclude the possibility that the other potential power sources will also attempt to repower the same equipment. Overcurrent protection and electrical isolation is evaluated for the fixed FLEX generators installed per electrical design change package ECP-12-000459, "DDSAFW Project Electrical Design and Installation," (Reference 32).

Procedure FSG-4 (Reference 16) provides necessary actions to prolong essential equipment and control power long enough to deploy and use FLEX equipment for plant recovery.

See Figure 1 attached: 480 VAC Single Line Diagram BDBEE Flow Path.

Exelon proposes the following alternative approaches to NEI 12-06 Revision 0 (Reference 5) and provides the basis for the alternative approach:

a) Exelon proposes an alternate approach to NEI 12-06 for having an auto start feature for the new 1 MW FLEX D/G in the SAFW Annex, which automatically energizes its associated bus.

Proposed Alternative:
In this alternate approach, upon loss of normal yard 12.47 KV power to the SAFW Building loads and D/G auxiliary load equipment (i.e., block heaters, engine battery, chargers, etc.) an automatic transfer switch (ATS) will automatically initiate a command to start the 1 MW FLEX D/G and, once stable, swap the source power from the normal yard power to the SAFW switchgear power and take on the loads connected to new panel ACPDPAF04 and, through it, to a new 120/208V Power Transformer (PXAF02) to supply new power panel ACPDPAF05.

Basis for the alternative approach:
The existing normal power to the SAFW pump motors is 480VAC, 3-phase, 60 Hz power from safety-related Bus 14 and Bus 16. With implementation of modification ECP-12-000459, "DDSAFW Project Electrical Design and Installation," (Reference 32), upon loss of normal bus power, the operators are able to manually transfer the power source to the SAFW pump motors from their normal power source to the 1 MW FLEX D/G via Class 1E manual transfer switches 43/PSF01A and 43/PSF01B (Figure 1). ECP-12-000459

supplies the 1 MW FLEX D/G Non-Safety Related Emergency source of power to these switches. For use in emergencies, the Operators will start the D/G manually if it has not started prior to this time due to the loss of normal yard 12.47 KV power. With the generator bus voltage achieving a nominal 480V within 10 seconds, the operator can then manually start the SAFW pumps and other FLEX loads. The newly installed D/G and electrical distribution system is completely independent, and physically separated from the plant electrical distribution system except at the connection to the Manual Transfer Switches. When normal yard power recovers, the automatic transfer switch is inhibited from transferring back to normal yard power until operator action is taken.

Use of the 1 MW FLEX D/G to power the SAFW pumps as a FLEX strategy was previously accepted as an alternative approach to NEI 12-06 (ML14007A704, Reference 27). While the D/G auto start feature was not identified prior to the ISE review, the auto start feature does not automatically power the SAFW pumps and other FLEX loads. The auto start feature is used to repower the 1 MW FLEX D/G auxiliary load equipment to maintain generator readiness for a BDBEE. Providing power to mitigation equipment from the 1 MW FLEX D/G must be performed manually as previously described. Exelon requests NRC Staff review and approval of this auto start feature as an acceptable alternative to the NEI 12-06 guidance.

b) Exelon proposes an alternate approach to NEI 12-06 for protection of FLEX equipment as stated in Section 5.3.1 (seismic,) Section 7.3.1 (severe storms with high winds), and Section 8.3.1 (impact of snow, ice and extreme cold).

Proposed Alternative:
This alternate approach will be to store "N" sets of equipment in a fully robust building and the +1 set of equipment in a commercial building. For all hazards scoped in for the site, the FLEX equipment will be stored in a configuration such that no one external event can reasonably fail the site FLEX capability (N).

Basis for the alternative approach:
To ensure that no one external event will reasonably fail the site FLEX capability (N), Exelon will ensure that N equipment is protected in the robust building. To accomplish this, Exelon will develop procedures to address the unavailability allowance as stated in NEI 12-06 Section 11.5.3., (see Maintenance and Testing section below for further details). This section allows for a 90-day period of unavailability. If a piece of FLEX equipment stored in the robust building were to become or found to be unavailable, Exelon will impose a shorter allowed outage time of 45 days. For portable equipment that is expected to be unavailable for more than 45 days, actions will be initiated within 24 hours of this determination to restore the site FLEX capability (N) in the robust storage location and implement compensatory measures (e.g., move the +1 piece of equipment into the robust building) within 72 hours where the total unavailability time is not to exceed 45 days. Once the site FLEX capability (N) is restored in the robust

storage location, Exelon will enter the 90-day allowed out of service time for the unavailable piece of equipment with an entry date and time from the discovery date and time.

MAINTENANCE AND TESTING

- The unavailability of equipment and applicable connections that directly performs a FLEX mitigation strategy for core, containment, and SFP should be managed such that risk to mitigating strategy capability is minimized.
  - The unavailability of plant equipment is controlled by existing plant processes such as the Technical Specifications. When plant equipment which supports FLEX strategies becomes unavailable, then the FLEX strategy affected by this unavailability does not need to be maintained during the unavailability.
  - The required FLEX equipment may be unavailable for 90 days provided that the site FLEX capability (N) is met. If the site FLEX (N) capability is met but not protected for all of the site's applicable hazards, then the allowed unavailability is reduced to 45 days.
  - The duration of FLEX equipment unavailability, discussed above, does not constitute a loss of reasonable protection from a diverse storage location protection strategy perspective.
  - If FLEX equipment or connections become unavailable such that the site FLEX capability (N) is not maintained, initiate actions within 24 hours to restore the site FLEX capability (N) and implement compensatory measures (e.g., use of alternate suitable equipment or supplemental personnel) within 72 hours.
  - If FLEX equipment or connections to permanent plant equipment required for FLEX strategies are unavailable for greater than 45/90 days, restore the FLEX capability or implement compensatory measures (e.g., use of alternate suitable equipment or supplemental personnel) prior to exceedance of the 45/90 days.

For NEI 12-06 Section 5.3.1, seismic hazard, Exelon will also incorporate these actions:

- Large portable FLEX equipment such as pumps and power supplies should be secured as appropriate to protect them during a seismic event (i.e., Safe Shutdown Earthquake (SSE) level).
- Stored equipment and structures will be evaluated and protected from seismic interactions to ensure that unsecured and/or non-seismic components do not damage the equipment.

For NEI 12-06 Section 7.3.1, severe storms with high winds, Exelon will also incorporate this action:

- For a 2-unit site, (N+1) of on-site FLEX equipment are required. The plant screens in per Sections 5 through 9 for seismic, flooding, wind (both tornado and hurricane), snow, ice and extreme cold, and high temperatures.
  - To meet Section 7.3.1.1.a, either of the following are acceptable:

- All required sets (N+1) in a structure(s) that meets the plant's design basis for high wind hazards, or
- (N) sets in a structure(s) that meets the plant's design basis for high wind hazards and (+1) set stored in a location not protected for a high wind hazard.

For NEI 12-06 Section 8.3.1, impact of snow, ice and extreme cold, Exelon will also incorporate this action:

- Storage of FLEX equipment should account for the fact that the equipment will need to function in a timely manner. The equipment should be maintained at a temperature within a range to ensure its likely function when called upon. For example, by storage in a heated enclosure or by direct heating (e.g., jacket water, battery, engine block heater, etc.).

Exelon will meet all of the requirements in NEI 12-06 Section 6.2.3.1 for external flood hazard and Section 9.3.1 for impact of high temperatures.

c) Exelon proposes an alternative approach to the N+1 requirement applicable to hoses and cables as stated in Section 3.2.2 of NEI 12-06. NEI 12-06, Section 3.2.2 specifically states that a site will have FLEX equipment to meet the needs of each unit on a site plus one additional spare. This is commonly known as N+1 where N is the number of units at a given site. The relevant text from NEI 12-06 is as follows: "In order to assure reliability and availability of the FLEX equipment required to meet these capabilities, the site should have sufficient equipment to address all functions at all units on-site, plus one additional spare, i.e., an N+1 capability, where "N" is the number of units on-site. Thus, a two-unit site would nominally have at least three portable pumps, three sets of portable ac/dc power supplies, three sets of hoses & cables, etc."

NEI 12-06, Section 11.3.3 states: "FLEX mitigation equipment should be stored in a location or locations informed by evaluations performed per Sections 5 through 9 such that no one external event can reasonably fail the site FLEX capability (N)."

Typically the hoses utilized to implement a FLEX strategy are not a single continuous hose but are composed of individual sections of a smaller length joined together to form a sufficient length. In the case of cables, multiple individual lengths are used to construct a circuit such as in the case of 3-phase power.

Proposed Alternative:

NEI 12-06 currently requires N+1 sets of hoses and cables. As an alternative, the spare quantity of hose and cable is adequate if it meets either of the two methods described below:

Method 1: Provide additional hose or cable equivalent to 10% of the total length of each type/size of hose or cable necessary for the "N" capability. For each type/size of hose or

cable needed for the "N" capability, at least 1 spare of the longest single section/length must be provided.

- Example 1-1: An installation requiring 5,000 ft. of 5 in. diameter fire hose consisting of 100 50 ft. sections would require 500 ft. of 5 in. diameter spare fire hose (i.e., ten 50 ft. sections).
- Example 1-2: A pump requires a single 20 ft. suction hose of 4 in. diameter, its discharge is connected to a flanged hard pipe connection. One spare 4 in. diameter 20 ft. suction hose would be required.
- Example 1-3: An electrical strategy requires 350 ft. cable runs of 4/0 cable to support 480 volt loads. The cable runs are made up of 50 ft. sections coupled together. Eight cable runs (2 cables runs per phase and 2 cable runs for the neutral) totaling 2800 ft. of cable (56 sections) are required. A minimum of 280 ft. spare cable would be required or 6 spare 50 ft. sections.
- Example 1-4: An electrical strategy requires 100 ft. of 4/0 cable (4 cables, 100 ft. each) to support one set of 4 kv loads and 50 ft. of 4/0 (4 cables, 50 ft. each) to support another section of 4 kv loads. The total length of 4/0 cable is 600 ft. (100 ft. x 4 plus 50 ft. x 4). One spare 100' 4/0 cable would be required representing the longest single section/length.

Method 2: Provide spare cabling and hose of sufficient length and sizing to replace the single longest run needed to support any single FLEX strategy.

- Example 2-1 – A FLEX strategy for a two unit site requires 8 runs each of 500 ft. of 5 in. diameter hose (4000 ft. per unit). The total length of 5 in. diameter hose required for the site is 8000 ft. with the longest run of 500 ft. Using this method, 500 ft. of 5 in. diameter spare hose would be required.

For either alternative method, both the N sets of hoses or cables and the spare set of hoses or cables would all be kept in a location that meets the reasonable protection requirements for the site.

Basis for the alternative approach:

The NRC has endorsed (ML15125A442, Reference 33) the NEI position paper (ML15126A135, Reference 34) for the above stated alternate approach. If using Method 2, per the endorsement letter, Exelon will ensure that the FLEX pumps and portable generators are confirmed to have sufficient capability to meet flow and electrical requirements when a longer spare hose/cable is substituted for a shorter length. Exelon acknowledges the NRC staff has not reviewed and is not endorsing the specific examples included in the NEI endorsement request dated May 1, 2015. If necessary, Exelon will provide additional justification regarding the acceptability of various cable and hose lengths with respect to voltage drops, and fluid flow resistance, rather than merely relying on the additional, longest length cable/hose as implied by Example 1-4 in the subject letter.

Hoses and cables are passive devices unlikely to fail provided they are appropriately inspected and maintained. The most likely cause of failure is mechanical damage during handling provided that the hoses and cables are stored in areas with suitable environmental conditions (e.g., cables stored in a dry condition and not subject to chemical or petroleum products). The hoses and cables for the FLEX strategies will be stored and maintained in accordance with manufacturers' recommendations including any shelf life requirements. Initial inspections and periodic inspections or testing will be incorporated in the site's maintenance and testing program implemented in accordance with Section 11.5 of NEI 12-06.

Therefore, the probability of a failure occurring during storage is minimal, resulting in the only likely failure occurring during implementation. Mechanical damage will likely occur in a single section versus a complete set of hose or cable. Therefore, the N+1 alternative addresses the longest individual section/length of hose or cable.

Providing either a spare cable or hose of a length of 10% of the total length necessary for the "N" capability or alternatively providing spare cabling or hose of sufficient length and sizing to replace the single longest run needed to support any single FLEX strategy is sufficient to ensure a strategy can be implemented. Mechanical damage during implementation can be compensated for by having enough spares to replace any damaged sections with margin. It is reasonable to expect that an entire set of hoses or cables would not be damaged provided they have been reasonably protected.

d) Exelon proposes an alternate approach to NEI 12-06 for having primary and alternate injection points to the S/Gs for the portable FLEX S/G injection pump, as specified by NEI 12-06, Section 3.2.2 and Table D-1.

Proposed Alternative:
This alternate approach will be to have one connection point for the portable FLEX S/G injection pump. The portable FLEX S/G injection pump is located in the SAFW Building Annex and will be staged outside of this building if used. There is one connection point for the portable FLEX S/G injection pump discharge hose, which is inside the SAFW Building. An alternate injection point is not planned due to the multiple and diverse methods of delivering water to the S/Gs using the SAFW pumps powered by the SAFW D/G using the previously accepted alternative approach (ML14007A704, Reference 27) to NEI 12-06.

Basis for the alternative approach:
Ginna has multiple and diverse methods to deliver water to the S/Gs from a SAFW pump powered by the SAFW D/G. Only one of the two SAFW pumps is needed for performing the heat removal function. Either SAFW pump is capable of being powered by the SAFW D/G and can be aligned to feed both S/Gs through their discharge headers and one of two normally isolated cross connections between their discharge headers (See

Figure 2 attached: FLEX SAFW System Pumps and Connections). One cross connection is located in the SAFW Building and the other cross connection is located in the Auxiliary Building.

The multiple and diverse methods of delivering water to the S/Gs using a SAFW pump or a portable FLEX S/G injection pump meets the intent of NEI 12-06 Section 3.2.2 and Table D-1. Exelon requests NRC Staff review and approval of this alternative approach as an acceptable alternative to the NEI 12-06 guidance.

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

R. E. Ginna Station expects to comply with the Order implementation date and no relief/relaxation is required at this time.

6 Open Items from Overall Integrated Plan and Interim Safety Evaluation

The following is a list of the open items from the OIP that have been added, deleted, completed, or revised since the last six month status report, with an explanation of the changes:

a) Maintain Core Cooling & Heat Removal (Steam Generators Available)

Open Item 5: Develop and implement a FLEX method / procedure to refill the new SAFW CST prior to losing suction.

This item is **complete.** FSG-6, "Alternate SAFW DI water Storage Tank Makeup," (Reference 9) provides a method of refilling the SAFW DI Water Storage Tank by taking suction from the Lake Ontario and discharging through a fill connection at the tank. This will allow SAFW Pumps to continue operation.

Open Item 10: Develop site specific playbook for delivery of portable FLEX equipment from the NSRC to the site.

This item is **complete.** The site specific playbook for delivery of portable FLEX equipment from the NSRC to the site has been developed and approved.

Open Item 12: Develop and implement procedures to close Safety Injection (SI) Accumulator injection valves or vent the SI Accumulators prior to nitrogen injection into the RCS.

This item is **complete.** See response to ISE Confirmatory Item 3.2.1.A.

Open Item 17: Perform an analysis to demonstrate adequate manpower, communications capability, and habitability for local operation of the S/G ARVs. If this cannot be demonstrated, implement a design change to provide for ARV control from the Control Room for seismic and tornado missile events.

This item is **complete.** The Phase 2 Staffing Study (Reference 35) concluded that GINNA Station has adequate resources / staffing to locally operate ARVs in the Intermediate Building Cold Side (IB) in the event of an ELAP. ECA-0.0 "Loss of All AC Power" (Reference 25) provides actions to open doors in the IB that provide a "chimney effect" in order to stabilize and then lower surrounding area temperatures in the vicinity of the ARVs. RWA-1316-001, "FLEX Intermediate Building GOTHIC Heat Up Analysis," (Reference 36) supports this. ECP-14-000727, "Intermediate Building Block Wall Reinforcement," (Reference 37) is in progress that will reinforce / protect the IB walls from a Tornado / Missile event thereby maintaining the IB in a condition that the ARVs will remain accessible following an event. Communications upgrades are being performed in accordance with "9.3 Communications". This includes a portable radio repeater, satellite phones and a rapid case. Operators of the ARVs will exit the IB to communicate with the control room and reenter to operate the ARVs as needed.

FSG-5, "Initial Assessment and FLEX Equipment Staging", (Reference 38) will contain lighting strategies such that lighting will be available for Operators as follows:

- Personal flashlights stored empty, in a protected cabinet
- Batteries to supply personal flashlights, in same protected cabinet as above
- Portable flood lights w/ power cords, stored in a protected cabinet
- Head lamps stored empty, in a protected cabinet
- Batteries to supply head lamps, in the same protected cabinet as above

FSG-5 provides guidance on alternate HVAC (portable fans / doors to open).

Open Item 19: Perform an analysis or implement a design change to qualify S/G Pressure instrumentation for a Tornado Missile event.

This item is **complete.** One train of S/G pressure instrumentation will be qualified for a tornado missile event. Attachments A & B of FSG-7, "Loss of Vital Instrumentation or Control Power," (Reference 28) attempt to restore MCB readings of S/Gs A & B. If the S/G pressure instrumentation was damaged, use of FSG-7 Attachment P would direct an operator to take local readings of that parameter from a protected location in the Intermediate Building. Also, FSG-7 Attachments I, J, M & N provide a means of obtaining RCS T_{hot} and T_{cold} temperatures, if needed, to allow a symmetric cooldown to be effected.

Open Item 22: Develop and implement procedures to refill the new CST from an alternate water source prior to depleting the usable volume (approximately 15 hours after the event).

This item is **complete.** FSG-6 "Alternate SAFW DI Water Storage Tank Makeup" (Reference 9) provides guidance for filling the tank using a FLEX pump taking suction from Lake Ontario, Condenser Hotwell (if available) or the Outside Condensate Storage Tank (if available).

Open Item 25: Implement a design change to install a new isolation valve upstream of the FLEX connection to S/G B in case a tornado missile impacts a section of unprotected piping between the SAFW Building and the connection point.

This item is **complete.** ECP-14-000749 (Reference 23) will implement the SAFW cross connect modification in the Auxiliary Building to ensure that flow can be provided downstream of the damaged piping (from the tornado). It will install a valve to ensure that back flow to the upstream damaged piping cannot occur. ECP-13-000483, "DDSAFW Project SAFW Piping Tie-in Design and Installation," (Reference 39) will install a single FLEX connection to the SAFW cross-tie line in the SAFW Pump Room (V-9757). These two ECPs together allow for the discharge of the FLEX pump to provide flow to both S/Gs.

Open Item 26: Implement a strategy to provide a sustainable source of nitrogen and/or air to the Power Operated Relief Valves (PORVs) to protect RCS Integrity during a BDBEE while in Mode 4 or Mode 5, loops filled.

This item is **complete.** Ginna does not plan to provide a long term source of nitrogen and/or air to the PORVs for mode 4/5 loops filled BDBEE event. A PORV can be cycled 50 times given 300 psig N2 accumulator pressure per DA-NS-92-014, "RCS Overpressurization Protection System Nitrogen Accumulator Tanks TRC03A & B Low-Pressure Limit," (Reference 40) analysis. However, the Nitrogen accumulators are maintained at greater than 725 psig per Alarm Response Procedure, AR-AA-15, "N2 Accum B Lo Press 725 psi," (Reference 41). At the normal accumulator tank pressure, 360 cycles are available for a single PORV. The UFSAR (Reference 6) indicates 40 cycles in 10 minutes is typical and this is consistent with 86-1234820, "Low Temperature Overpressure Analyses Summary Report" (Reference 42). This results in about 90 minutes of PORV cycle time for a single PORV. ([360 / 40] x 10min = 90 min) Two PORVs are expected to be available and SAFW is expected to be aligned in approximately half an hour. Consequently, adequate nitrogen is available to allow continued PORV function until well after SAFW heat transfer is established.

Open Item 27: Develop and implement procedures to provide guidance for water solid S/G cooldown using FLEX equipment.

This item is **deleted.** This is no longer in scope for a coping strategy. Current procedure ER-FIRE.3 "Alternate Shutdown for Aux Building Basement/Mezzanine Fire," (Reference 43) provides guidance for performing a water solid cooldown under a Fire Scenario.

b) Maintain RCS Inventory Control / Long Term Subcriticality

Open Item 33: Implement a design change to connect a new pre-staged high pressure charging pump and FLEX diesel driven portable charging pump to the RWST.

Open Item 35: Implement a design change to install a pump capable of pumping 75 gallons per minute (gpm) of borated water from the RWST into the RCS at 1500 psi, with discharge piping connected to the Safety Injection System.

Open Item 37: Implement a design change to connect a portable diesel engine driven high pressure pump to the RWST and the Safety Injection System, which is capable of pumping 75 gpm of borated water from the RWST to the RCS at 1500 psi.

These items are **complete.** RCS make-up will be achieved through a new Alternate RCS Injection System, with injection into the cold leg via the Safety Injection (SI) System. An Alternate RCS Injection System (33013-1230, "Alternate Charging System," P&ID, Reference 44) has been designed and will be installed prior to the Fall 2015 refueling outage, with final system tie-ins being made during the outage. The overall design strategy is to draw on the RWST and pump the borated water, using a high pressure positive displacement pump located in the SAFW Building, into the cold leg of the RCS, via the SI lines.

The Alternate RCS Injection FLEX pump suction piping will be tied into the RWST recirculation pump suction line that takes suction off the bottom of the tank (el. 237' 8"). The 3" Alternate RCS Injection FLEX pump suction piping will be run through the Auxiliary Building to buried lines between the Auxiliary Building and the SAFW Annex, to the Alternate RCS Injection pump in the SAFW Building. The Alternate RCS Injection FLEX pump will be mounted on an 8" concrete pad. The positive displacement pump will be powered by the 1MW diesel generator housed in the SAFW Annex. It will provide a flow of 75 gpm at 1500 psig, through a 2" pump discharge line that parallels the suction line into the Auxiliary Building basement, west of the RWST, and into the Safety Injection "A" and "B" header. The entire system will be manually operated and controlled, making it impervious to Auxiliary Building fires or floods.

Since the Alternate RCS Injection System interfaces with the Safety Injection pump discharge headers, safety related isolation valves are being installed to provide a boundary. Each Alternate RCS Injection branch line feeding into the SI "A" and "B" headers will be equipped with a safety related normally closed ball valve. The common line feeding the two branch lines will also have a safety related normally closed ball valve to provide double isolation for each header. These valves are classified as Containment Isolation Valves (CIVs). Additionally, a check valve in the common line has been added to ensure that contaminated water does not migrate through the Auxiliary Building to the SAFW Building or SAFW Annex, which are not Radiologically Controlled Areas (RCA).

Since the Alternate RCS Injection FLEX pump is a positive displacement pump, a flow of 75 gpm from the pump is constant. A regulating valve on the pump skid ensures downstream pressure does not exceed the valve setting. Downstream pressure above the setting will cause a portion of the flow to be bypassed back to the pump suction. The regulating valve setting of 1575 psig ensures that the required flow of 75 gpm can be fed into the reactor pressurized to 1500 psig. Additionally, a relief valve on the pump skid is set at 1775 to 1875 psig to ensure that the pressure remains well below the pressure/temperature rating of the downstream piping.

A trailer-mounted diesel driven Alternate RCS Injection FLEX pump is being provided as a redundant pump to the permanently mounted pump. Hose connections, at valves 9056 and 9072 on P&ID 33013-1230 (Reference 44), provide the ability to connect the trailer mounted pump to the hard-piped Alternate RCS Injection System.

Open Item 36: Develop and implement procedures to initiate RCS boration prior to commencing RCS cooldown to provide margin to prevent re-criticality.

This item is **complete.** ECA-0.0, "Loss of All AC Power," (Reference 25) has the Operators monitor the Reactor for Subcriticality as a continuous action step that is performed immediately after Steam Generator depressurization (RCS cooldown) is commenced. If unable to verify subcriticality using Nuclear Instrumentation and an ELAP is in progress, then FSG-1, "Long Term RCS Inventory Control," (Reference 11) can be performed.

See the response to ISE Confirmatory Item 3.2.1.8.A for additional information.

Open Item 38: Ensure the NSRC can supply a mobile boration unit.

This item is **complete.** The NSRC can supply a Mobile Boration Unit that consists of a 1000-gallon tank capable of heating a boric acid solution of up to 7750 ppm to 130°F in less than four hours. The Unit includes agitator, heaters and controls, hoses and power

supplies. Ginna will also be receiving a Reverse Osmosis Water Purification Unit from the NSRC. The intent is to utilize the output of the NSRC supplied water purification unit to supply the Mobil Boration Unit.

c) Maintain Core Cooling & Heat Removal (S/Gs Not Available) (Modes 5 & 6)

Open Item 40: Perform an analysis to determine the transition point from gravity fill of the refueling cavity to when forced makeup is required.

This item is **complete.** DA-ME-15-006, "Fukushima Timeline Analysis," Attachment 2, RWST Gravity Drain Assessment, (Reference 21) determined the transition point from gravity fill of the refueling cavity to when forced makeup is required.

Open Item 43: Develop and implement procedures to makeup to the refueling cavity from the new CST, UHS, or RWST to maintain refueling cavity level and boron concentration.

This item is **complete.** FSG-14, "Shutdown RCS Makeup" (Reference 45) will provide guidance for maintaining Refueling Cavity level using SAFW DI Water Storage Tank, Lake Ontario, or the RWST.

d) Maintain Spent Fuel Pool Cooling

Open Item 54: Implement a strategy to provide for a protected makeup connection to the Spent Fuel Pool (SFP) cooling piping to provide makeup to the SFP that exceeds SFP boil-off and provide a means to supply SFP makeup without accessing the SFP walkway.

This item is **complete.** FSG-11, "Alternate SFP Makeup and Cooling," (Reference 14) provides direction to fill the SFP at a flanged connection point at V-8662. This valve is located in the Auxiliary Building Basement and allows for a fill path at other than the SFP walkway. Access would be through the East Stairwell and across the Auxiliary Building Basement. FSG-5, "Initial Assessment and FLEX Equipment Staging," (Reference 38) initiates action to provide vent paths for the Spent Fuel Pool Area. This includes opening doors in the Auxiliary Building, Auxiliary Building Tornado dampers, Fuel Cask Handling Building doors and providing portable air mover. This procedure is implemented prior to SFP boiling.

Open Item 55: Provide the necessary connecting hoses and/or equipment to work with existing pumps and water sources for filling the SFP.

This item is **complete.** FSG-11 (Reference 14) provides direction to maintain level in the Spent Fuel Pool using FLEX pumps / hoses / valves and manifolds.

Open Item 56: Implement new FSG-11, Alternate SFP Makeup and Cooling, to provide multiple strategies for establishing a diverse means of SFP makeup and cooling for at least 72 hours.

This item is **complete.** Procedure FSG-11 (Reference 14) provides multiple strategies for establishing a diverse means of SFP makeup. The primary SFP makeup strategy will be accomplished using a medium pressure portable FLEX pump with water supply from Lake Ontario. A medium pressure portable FLEX pump will be moved from its storage location into location near the northwest corner of the Screen House. Non-collapsible suction hose will be directed into Lake Ontario and discharge hose routed to the edge of the SFP and tied down. Sufficient flow will be established to recover and maintain SFP level.

If Lake Ontario is not accessible, the medium pressure portable FLEX pump can be located at the SAFW DI Water Storage Tank and take suction from the SAFW DI Water Storage Tank. If necessary, an alternate makeup flow path to the SFP can be establish by spraying the SFP with Blitz fire nozzles located within 75 feet of the SFP.

FSG-11 provides direction to fill the SFP at a flanged connection point at V-8662. This valve is located in the Auxiliary Building Basement and allows for a fill path at other than the SFP walkway. Access would be through the East Stairwell and across the Auxiliary Building Basement.

e) Safety Function Support

Open Item 60: Implement a strategy to supply the battery chargers from the 1 MW D/G using existing plant equipment connection points.

Open Item 61: Implement a strategy to supply the battery chargers from a 100 kW D/G using existing plant equipment connection points.

These items are **complete.** The primary strategy will be to power one or more of the protected battery chargers for the 125 VDC batteries from the 1 MW SAFW D/G to ensure vital instrumentation remains powered. Temporary cables will be run from the 1 MW SAFW D/G connections in the SAFW Annex to a portable distribution panel and/or to a distribution panel in the Waste Gas Compressor (WGC) Room. From the portable distribution panel cable can be routed to one battery charger on each train. From the distribution panel in the WGC Room cable can be routed to breakers on MCC C and MCC D to power one battery charger for each train. There are two battery chargers available to each of the station batteries, both with a capacity of 200 amps at 132 Volts DC and requiring up to 58 amps at 480 Volts AC.

The alternate strategy will be implemented in the event that the 1 MW SAFW D/G cannot be used to provide power to the battery chargers. A FLEX 100 KW FLEX D/G capable of delivering 150 amps at 480 Volts 3-phase will be connected to one or more of the protected battery chargers for the 125 VDC batteries to ensure vital instrumentation remains powered. This alternate strategy will use two methods similar to the 1 MW SAFW D/G. To power the distribution panel in the WGC Room, the 100 KW FLEX D/G will be transported to outside the SAFW Annex overhead door. Temporary cables will be routed from the 100 KW FLEX D/G to a junction box in the SAFW Annex to feed the distribution panel in the WGC Room and from the distribution panel in the WGC Room to battery charger breakers for each train on MCC C and MCC D. To power the portable distribution panel the 100 KW FLEX D/G will be transported to the TSC area. Temporary cables will be routed from the 100 KW FLEX D/G to the portable distribution panel and from the portable distribution panel to one battery charger on each train.

Open Item 62: Provide the necessary connecting hoses and/or equipment to work with existing pumps and water sources for filling the SFP.

This item is **complete.** See response to ISE Confirmatory Item 3.2.4.2.A.

Open Item 63: Perform an analysis to evaluate the Battery Room low temperature for an ELAP event, assuming -16°F air temperature to determine if, and when, Battery Room heating is required.

This item is **complete.** Ginna's design basis vital station battery sizing calculation DA-EE-97-069, "Sizing of Vital Batteries A and B," (Reference 46) utilizes a minimum Battery Room ambient temperature of 55°F. This temperature was utilized for both the station blackout analysis (4-hour coping period) as well as the SI sequence analysis. Ginna has also performed a special case analysis to verify the capacity of the station batteries for an extended 8-hour SBO (ELAP) under DA-EE-2001-028, "Vital Battery 8-Hour Capacity" (Reference 47). A more realistic minimum Battery Room ambient temperature of 65°F is used for this analysis. Elevated temperatures are not considered in these analyses as they actually improve battery performance by lowering the internal resistance of the battery as well as speeding up the internal chemical reactions.

As discussed in section 7.5.3.1 of DA-EE-97-069, the 55°F ambient temperature is conservative and would not be seen in the Battery Rooms. DA-ME-99-033, "Vital Battery Temperatures During Station Blackout Event," (Reference 48) has demonstrated that the Battery Room temperatures will not drop below 65°F during an 8-hour station blackout scenario (ELAP). Therefore, a 65°F minimum ambient temperature was used in the extended SBO analysis. The DA-ME-99-033 calculation uses a set of very conservative assumptions (e.g., inverter heat loads not credited, which would add several degrees to the rooms). Using the 55°F (65°F for the extended SBO analysis) ambient temperature in the battery sizing calculations provides conservative margin in

the analysis. Therefore, the station battery is shown, through the existing design analyses, to be able to perform its function for the duration of an ELAP event.

Open Item 64: Implement a strategy for accessing the UHS for all BDBEEs and to meet required deployment times. This must also address how debris in the UHS or other raw water sources will be filtered / strained and how the resulting debris will effect core cooling.

This item is **complete.** The DDSAFW DI Water Storage Tank provides ~24 hours of feed water for the S/Gs (DA-ME-14-020, "Deionized Water Tank Inventory Requirements," Reference 49). This tank is protected from all events (seismic, tornado and flood), and will be used as a heat sink until the ultimate heat sink is available. Emergency Operating Procedure ATT-5.5, "Attachment SAFW with Suction from DI Water Storage Tank During SBO," (Reference 7) starts the SAFW pumps and is accomplished within 37 minutes of event initiation. FSG-3, "Alternate Low Pressure Feedwater," (Reference 10) FSG-6, "Alternate SAFW DI Water Storage Tank Makeup," (Reference 9) and FSG-12, "Alternate CNMT Cooling," (Reference 50) all have steps directing use of Lake Ontario (UHS). FSG-11, Alternate SFP Makeup and Cooling," (Reference 14) directs using Lake Ontario for Spent Fuel Pool makeup or spray and is directed by ECA-0.0, "Loss of All AC Power" (Reference 25). In the area of the discharge canal there are multiple options to place a hose into the discharge canal to provide makeup to the DDSAFW DI Water Storage Tank or S/Gs if the preferred area (by the grating) is blocked.

FLEX suction hoses have a strainer installed on the end of the hose. Each strainer has ~3.7 X the surface area of the non-collapsible suction hose. Strainer perforation diameter is 3/8". There are 19 holes per row and 50 rows around the diameter of the strainer, giving a surface area of ~105 in^2. Non-collapsible suction hoses are 6" diameter giving a surface area of ~ 28 in^2. There are two suction strainers available. In the unlikely event that one becomes clogged there would be a brief interruption to shut down the pump, swap strainers, and restart the pump. Monitoring of pump flow and pressure would indicate a possible clogged suction strainer. FSG-5, "Initial Assessment and FLEX Equipment Staging," (Reference 38) directs staging of debris removal equipment. FLEX pumps with flexible suction hoses can be maneuvered to access Lake Ontario water at various places on the discharge canal.

The water chemistry of Lake Ontario has minimal effect on long term heat transfer in the Steam Generators (NWT 167, Use of Lake Ontario Water in Steam Generators During Hot Shutdown attached to June 23, 1981 letter to NRC, Reference 51). Lake Ontario water is used to feed S/Gs when condensate grade water is not available per ER-AFW.1, "Alternate Water Supply to the AFW Pumps," (Reference 52). By letter dated June 17, 1999 (Reference 53), the staff concluded that the licensee's approach (i.e., use of Condensate Storage Tanks and then Lake Ontario) demonstrates that it can achieve

and maintain hot shutdown for 72 hours following a seismic event. By letter dated September 29, 1981 (Reference 69), the staff issued a letter to Ginna regarding Systematic Evaluation Program (SEP) Topics in which the staff concluded that the licensee should provide procedures that should caution operators on the long-term use of service water to feed the S/Gs. The condenser Hotwell has ~30,000 gallons of DI water available and can be gravity filled from the Condensate Storage Tanks. The NSRC can provide a portable filtering/demineralizer system to provide filtered or condensate grade water from Lake Ontario or other onsite sources such as the yard fire loop.

During a flood, access to the ultimate heat sink will be temporarily unavailable due to floodwater on site. Results of the NTTF Recommendation 2.1, Flooding Reevaluation (Reference 54), show that the persistence of the flood is approximately 11 hours. The onsite water sources are sufficient to supply water for this timeframe.

Open Item 70: Develop and implement procedures to establish battery room ventilation within 72 hours of the event to prevent exceeding the unacceptable hydrogen concentration limit of 2%, once the GOTHIC analysis has been completed as discussed in Phase 2.

This item is **complete.** Station batteries are expected to last 8 hours during an ELAP (Reference 47). Monitoring of battery voltage is directed in ECA-0.0 (Reference 25) with a re-direction to FSG-4, "ELAP DC Bus Load Shed/Management," (Reference 16) at 108.6 DC volts. Steps in FSG-4 start normal Battery Room ventilation (DC powered vent fans) after establishing temporary power to the station battery chargers. FSG-4 also directs establishing temporary Battery Room ventilation if required. FSG-5 (Reference 38) directs establishing Battery Room ventilation. Guidance for Battery Room ventilation is also provided in Alarm Response AR-C-13, "Battery Rooms Loss of Ventilation" (Reference 55).

Gothic Analysis DA-EE-99-068, "Vital Battery Room Hydrogen Analysis," (Reference 56) indicates 2% H2 is not exceeded until 73.3 hours without any ventilation.

f) ISE Confirmatory Items

ISE Confirmatory Item 3.1.1.A: Confirm that the licensee addresses the results of the seismic and flooding re-evaluations pursuant to the NRC's 50.54(f) letter of March 12, 2012.

This item is **complete.** The Seismic Hazard and Screening Report (Reference 57) concludes that the SSE envelopes the GMRS from 1-10 Hz and that the GMRS is slightly higher than the SSE above 10 Hz. Ginna will perform a high frequency confirmation in accordance with the NRC prioritization process.

The Flood Hazard Reevaluation Report (Reference 54) concludes that local intense precipitation, probable maximum flooding in streams and rivers, and select combined-effect flood combinations were not bounded by the design basis flood hazard. Therefore, Ginna plans to prepare a full Integrated Assessment of flooding.

ISE Confirmatory Item 3.1.1.1.A: Protection, seismic - confirm that large portable FLEX equipment such as pumps and power supplies would be secured as appropriate to protect them during a seismic event and that stored equipment and structures would be evaluated and protected from seismic interactions to ensure that unsecured and/or non-seismic components do not damage the equipment.

This item is **complete.** It is planned to have FLEX portable equipment secured in the event of an earthquake and protected from seismic interactions. This will be completed prior to the end of the Fall 2015 refueling outage.

ISE Confirmatory Item 3.1.1.3.A: Procedural Interfaces – seismic - confirm that a reference source for the plant operators is provided that provides approaches to obtaining necessary instrument readings to support the implementation of the coping strategies.

This item is **complete.** FSG-7, "Loss of Vital Instrumentation or Control Power," (Reference 28) will provide Operators the ability to obtain system parameters should the power to the instruments be lost or wiring damage that precludes the instrument from being read in the Control Room. The Operator will be able to obtain a reading in the Control Room (wiring intact) or at the Containment Penetration (field wiring not intact).

ISE Confirmatory Item 3.1.4.2.A: Snow, ice and extreme cold - confirm that potential loss of access to the UHS and flow path due to extreme low temperatures, e.g., due to ice blockage or formation of frazil ice, is assessed and resolved.

This item is **complete.** Frazil ice at Ginna has historically occurred at the Intake Structure. The intake structure is not credited for FLEX. Frazil ice at the suction of hoses dropped into the discharge canal for FLEX or SAFER pumps is reasonably expected to not be a concern requiring special equipment for the following reasons:

- Frazil ice blockage has been managed effectively at Ginna by accelerating and decelerating the water going through the intake structure by changing level in the Screenhouse. This agitation has historically been effective at disrupting the frazil ice and re-establishing normal flow rates. For FLEX pumps, the length of hose dropped into the discharge canal is short enough to allow operators to physically agitate the hose to disrupt frazil ice if it were to occur. Alternatively the drafting pumps have variable speed engines and discharge valves that could be used to accelerate/decelerate flow similar to the intake structure strategy.

- Frazil ice has occurred at Ginna during late night hours. Operators would be cognizant of the potential for frazil ice during extreme cold conditions and cognizant of the potential vulnerability during late night hours. Margin is available in the FLEX response times and integrated flows/heat removal associated with FLEX/SAFER pumps to accommodate brief periods of flow degradation from FLEX/SAFER pumps for frazil ice management.

Potential icing over of the discharge canal could be effectively managed by on-site personnel using available equipment. If the ice is thin then it could be broken using readily available lengths of piping or boards. Options for accessing the discharge canal if the ice is thick include but are not limited to use of the debris remover to break up the ice, accessing the water in the Screenhouse bays, or accessing the water in the discharge tunnels via removal of manways.

FSG-5, "Initial Assessment and FLEX Equipment Staging," (Reference 38) provides a precaution that if potential freezing conditions exist, strategies for use and protection of vulnerable FLEX equipment should be evaluated. Attachment C will provide additional strategies for extreme weather conditions. Strategies for protection include creating a continuous flow path such that freezing of vulnerable FLEX equipment (i.e., hose, pumps, etc.) will not occur. In addition, pumps and associated hosing can be drained when not in use to prevent freezing.

ISE Confirmatory Item 3.2.1.A: Confirm resolution of open item to develop and implement procedures to close SI accumulator injection valves or vent the SI accumulators prior to nitrogen injection into the RCS.

This item is **complete.** ECA-0.0, Loss of All AC Power," Appendix A (Reference 25) directs operators to Depressurize Intact S/Gs to 260 psig when establishing low pressure S/G feed and then Perform FSG-10, "Passive RCS Injection Isolation,"

(Reference 58) to isolate or vent the SI Accumulators, thereby preventing N2 injection to the RCS. However, this setpoint will be revised to comply with current guidance. (Passport AR #01704249-77, Reference 59). Ginna follows the advice in PA-PSC-0965, "PWROG Core Cooling Position Paper," (Reference 60).

ISE Confirmatory Item 3.2.1.1.A: Confirm completion of timelines used in conjunction with the thermal hydraulic analysis to document the duration of each phase for each critical function, and the basis for the duration.

This item is **complete.** S/G Dryout: Analysis RWA-1323-003 (Reference 61) states that S/G dryout occurs as early as 43 min after initiation of ELAP. DA-ME-15-006, "Fukushima Timeline Analysis," (Reference 21) has SAFW flow established to the S/Gs by 37 min into the event.

RCS Inventory: Per RWA-1323-003, two-phase natural circulation becomes less than one-phase circulation at 15.5 hours into the event. DA-ME-15-006 has the Alternate RCS Injection pump providing RCS makeup no later than 8 hours after initiation.

RCS Boration: To comply with NRC endorsement of the boron mixing generic concern, ECA-0.0, "Loss of all AC Power," (Reference 25) directs charging at 8 hours (Setpoint ID J.23; WOG Footnote ID V.08) into the event, per FSG-1, "Long Term RCS Inventory Control," (Reference 11) to ensure subcriticality is maintained. However, it is likely that charging will commence earlier per FSG-1 based on RVLIS and/or Pressurizer levels. Therefore, the boration time requirement is bounded by the requirement to maintain RCS inventory.

ISE Confirmatory Item 3.2.1.2.A: RCP seals - Confirm that, if RCP seals are changed to non-Westinghouse seals, the acceptability of the use of non-Westinghouse seals is addressed, and the RCP seal leakage rates for use in the ELAP analysis are provided with acceptable justification.

This item is **complete.** Low leakage RCP seals will not be installed. Westinghouse Model 93 RCPs are installed at Ginna.

ISE Confirmatory Item 3.2.1.8.A: The licensee informed the NRC staff of its intent to abide by the generic approach described in the PWROG August 15, 2013 position paper related to modeling the timing and uniformity of boric acid mixing within the RCS under natural circulation conditions potentially involving two-phase flow. Confirm that the additional conditions discussed in the NRC endorsement letter are satisfied, and that boration requirements are met.

This item is **complete.** The shutdown margin calculation is CALC-2014-0002, "Cycle 38 Reactor Engineering Calculations," (Reference 29) which analyzes for the most limiting

conditions (xenon free, largest cooldown, both zero and max seal leakage). RE-103, "Control of Reload Core Design," (Reference 62) ensures that adequate shutdown margin checks are performed for future operating cycles.

For the boration strategy:

- A newly installed (and electrically isolated) Alternate RCS Injection Pump powered from the new SAFW D/G, taking suction from the RWST (300,000 gallons) and discharging to the RCS, will be used to provide borated makeup to the RCS. This charging pump is located in the SAFW Building (SAFWB). This arrangement will include a discharge line routed through a protected portion of the Auxiliary Building to newly installed Safety Injection (SI) line connections on both trains. The new charging pump will be manually aligned as required. The alternate FLEX strategy is to use a diesel driven portable Alternate RCS Injection Pump taking suction from the RWST, connected at the SAFWB via a high pressure hose, to a staged connection to the newly installed SI line connections.
- To provide sufficient capacity of borated water makeup to the RCS, the new charging pump will be capable of pumping 75 gpm from the RWST into the RCS at 1500 psi. A portable diesel engine driven high pressure pump will provide alternate borated makeup capability to the RCS. This pump will also be capable of pumping 75 gpm of borated water from the RWST to the RCS at 1500 psi.
- The timing for RCS makeup is variable. At the maximum expected RCS and RCP seal leak rates, it is expected that natural circulation will transition from single-phase loop flow to two-phase loop flow at 2.8 hours (RWA-1323-003, Ginna RELAP5 ELAP Analysis for Mode 1, Reference 61) from the start of the event and that two-phase loop flow will be less than single-phase loop flow at approximately 15.5 hours from the start of the event (RWA-1323-003). To comply with NRC endorsement of the boron mixing generic concern, ECA-0.0, "Loss of all AC Power," (Reference 25) directs charging at 8 hours into the event (Setpoint ID J.23; WOG Footnote ID V.08 – this setpoint is subject to change upon further review but will be bounded by the need to make up RCS inventory) per FSG-1, "Long Term RCS Inventory Control," (Reference 11) to ensure subcriticality is maintained. However, it is likely that charging will commence earlier per FSG-1 based on RVLIS and/or Pressurizer levels.
- Prior to depleting the RWST inventory, a mobile boration unit supplied from the NSRC can be utilized to provide an indefinite source of water for Phase 3 boron control/RCS injection.

Additional information was provided in the August 2014 Six-Month Status Report (Reference 63).

ISE Confirmatory Item 3.2.3.A: Containment analysis - Confirm completion of containment analysis and incorporation of results into mitigation strategies.

This item is **complete.** Ginna's containment analysis is documented in RWA-1403-001, "GOTHIC FLEX Containment Analysis" (Reference 64). This analysis uses GOTHIC 8.0, has cases for Modes 1 and 5, and was benchmarked against previous LOCA analyses.

ISE Confirmatory Item 3.2.4.2.A: Ventilation - Confirm completion of GOTHIC calculations and incorporation of results into mitigation strategies.

This item is **complete.** GOTHIC calculations were performed as follows and results incorporated into mitigation strategies:

- RWA-1316-001, "FLEX Intermediate Building GOTHIC Heat Up Analysis." (Reference 36) This includes TDAFW pump and SRV/SV areas, which are located in the Intermediate Building.
- RWA-1403-001, "GOTHIC FLEX Containment Analysis." (Reference 64)
- RWA-1433-001, "Ginna Standby Auxiliary Feedwater Room Heat-Up Analysis." (Reference 30)
- CALC-2014-0006, "Auxiliary Building Environmental Conditions During ELAP." (Reference 65)
- ELAP specific Battery Room/Relay Room/Control Room analyses were not performed. Ginna plans to size and procure portable HVAC for these areas prior to Ginna's 2015 Refueling Outage.

ISE Confirmatory Item 3.2.4.4.A: Emergency lighting - Confirm development of lighting strategies.

This item is **complete.** As described in UFSAR (Reference 6), Section 9.5.3, Lighting Systems: Fixed emergency lighting units are provided in safety-related areas and other areas which contain fire hazards to facilitate emergency operations, manual fire-fighting, and access to and egress from each designated fire area. The lighting units are 8-hour rated [but are not seismically qualified]. In addition to the fixed lighting systems, portable battery-powered handlights are provided. Ginna safe shutdown panels are located in several areas of the plant. The lighting at the safe shutdown areas has been determined to be sufficient to perform all required safe shutdown tasks. This determination was made by a lighting survey conducted in conjunction with 10 CFR 50, Appendix R, compliance efforts. The Control Room 125-V dc emergency lighting system comes on for loss of ac power [does not load shed by FLEX]. The Control Room emergency lighting fixtures are fed from either the A or B station batteries. In the event of loss of either battery there is a transfer switch in the Control Room by which the operators can manually switch the emergency lighting feed from one train to the other. Should loss of either battery occur in the emergency lighting mode, an 8-hour-rated emergency light fixture located near the transfer switch will remain functional to provide sufficient lighting to perform the transfer. The 125-V dc power supply up to the point of termination at the emergency lighting fixtures is Class 1E and Seismic Category I. The emergency lighting

fixtures are standard. A prototype fixture has been seismically tested in accordance with IEEE 344-1975 to ensure continued operation of the fixtures in the event of an earthquake. In addition, an analysis of the seismically reinforced suspended ceiling has been performed to ensure that the ceiling, including the normal and emergency lighting fixtures, does not create a hazard to Control Room personnel or safety-related equipment during a seismic event.

Lighting in the SAFW Annex Building will be automatically powered from the SAFW D/G when in operation. Initial lighting in the SAFW Building Room will be from 8-hour Appendix R battery powered lighting, with portable flood lights being available to be deployed. The door to the SAFW Annex can be opened to help with lighting in the SAFW feed room.

FSG-5, "Initial Assessment and FLEX Equipment Staging," (Reference 38) will contain lighting strategies such that lighting will be available as follows:

- Personal flashlights stored empty, in a protected cabinet
- Batteries to supply personal flashlights, in same protected cabinet as above
- Portable flood lights w/ power cords, stored in a protected cabinet
- Head lamps stored empty, in a protected cabinet
- Batteries to supply head lamps, in the same protected cabinet as above

ISE Confirmatory Item 3.2.4.4.B: Communications - Confirm completion of upgrades.

This item is **complete.** Installation for the Flex Satellite Communication System will be performed under Work Order C92852633, "Fukushima – NTTF 9.3 Communication – Install Satellite Phones" (Reference 66). This Modification has been developed under ECP-14-000756, "Installation of FLEX Satellite Communications system to provide FLEX and NARs phone service to Control Room and TSC" (Reference 67). This project includes the installation of a satellite network that will provide a secondary path for the EMNet and NTTF Recommendation 9.3: Communications phones. This network is to provide essential communications in the Main Control Room (MCR) and in the Technical Support Center (TSC) during an extended loss of ac power due to a BDBEE. A permanently installed emergency power source for the secondary satellite network will be installed and made available at a minimum of 8 hours following a loss of ac power. Satellite network connectivity will be provided for three (3) Voice-Over Internet Protocol (VOIP) phones for FLEX communication along with one (1) laptop in the MCR. Satellite connectivity for one (1) EMNet NARS desktop PC and six (6) VOIP phones for FLEX communication are provided for the TSC. The satellite dish antenna may not survive an event; therefore, there is a portable satellite dish in protected storage.

A separately available Rapid Case with its own portable satellite dish (in case the installed satellite dish does not survive the event) and network will be available and

powered by its own portable generator. This system can operate standalone or can interface with the fixed system described above.

FSG-5 (Reference 38) will contain a communications plan. Onsite communications will use station radios in talk-around mode, will deploy a portable radio repeater for better radio reception, and will use bull horns. Irridium satellite phones are already in the MCR. Chargers for radio batteries will be powered from small 3.3 KW diesel generators.

ISE Confirmatory Item 3.2.4.5.A: Protected Area Access - Confirm that strategies are in place to allow access to protected areas as needed to execute mitigation strategies.

This item is **complete.** On-Shift Operations personnel carry security door access keys, that in the situation that the card reader system becomes disabled, will have unrestricted access to plant areas required for mitigating actions of a BDBEE.

There is currently no planned movement or deployment of equipment that specifically requires electrical power, such that consideration for a power supply strategy is required. Any such movement of gates, doors, fences, etc. will and can be performed by manual action.

Table 2 provides a summary of the open items documented in the OIP and those added in a subsequent six month status report, and the status of each item.

Table 2
Status of FLEX OIP Open Items

Ginna OIP Open Items	Status
1. Implement a design change to install permanent protected FLEX equipment connection points. (also see OI 23)	Started (8/2013)
2. Provide for onsite storage of Phase 2 FLEX components that is protected against external events by design or location. Implement a design change to provide a protected storage location for transportation (equipment and fuel) and debris removal equipment. Evaluate deployment strategies and deployment routes for hazards impact. Evaluate requirements and options and develop strategies related to the storage onsite of the FLEX portable equipment. Establish deployment routes from FLEX equipment storage locations to connection points. Develop a strategy and purchase equipment to respond to events that may require debris removal such as following a flood, tornado, or snow storm. Develop a strategy to move FLEX equipment, including providing reasonable protection from a BDBEE.	Started (2/2014)
3. Exceptions for the site security plan or other (license/site specific – 10 CFR 50.54x) requirements of a nature requiring NRC approval will be communicated in a future 6-month update following identification.	**Complete** (See the 2/2014 OIP Update Reference 70)
4. Develop and implement procedures to commence feeding the steam generators (S/Gs) from Standby Auxiliary Feedwater (SAFW) powered by the new SAFW Diesel Generator (D/G) and taking suction from the new Condensate Storage Tank (CST) prior to reaching 5 ft in the existing CSTs.	Started (2/2015)
5. Develop and implement a FLEX method / procedure to refill the new SAFW CST prior to losing suction.	**Complete** (This OIP Update 8/2015)

Ginna OIP Open Items	Status
6. Develop and implement a program and/or procedure to keep FLEX equipment deployment pathways clear or with identified actions to clear the pathways.	Started (8/2015)
7. Determine schedule for when NSRCs will be fully operational.	**Complete** (See the 8/2013 OIP Update Reference 71)
8. Define criteria for the local NSRC staging area by June 2013.	**Complete** (See the 2/2014 OIP Update Reference 70)
9. Establish a suitable local staging area for portable FLEX equipment to be delivered from the NSRC to the site.	**Complete** (See the 8/2014 OIP Update Reference 63)
10. Develop site specific playbook for delivery of portable FLEX equipment from the NSRC to the site.	**Complete** (This OIP Update 8/2015)
11. Perform an analysis to determine the diesel driven portable high pressure pump upper and lower head requirements to provide for a minimum of 215 gpm to a S/G without causing Reactor Coolant System (RCS) pressure to decrease to the point where nitrogen will be injected from the SI Accumulators, assuming suction is directly from the Ultimate Heat Sink (UHS).	Started (8/2014)
12. Develop and implement procedures to close Safety Injection (SI) Accumulator injection valves or vent the SI Accumulators prior to nitrogen injection into the RCS.	**Complete** (This OIP Update 8/2015)
13. Perform an analysis to determine the time to restore feed to a S/G if only one S/G was able to be supplied with feedwater after a trip and then feed is lost to that one S/G. This is to account for the reduction in water available for heat removal.	**Deleted** (See the 2/2014 OIP Update)
14. Implement the design change to install the 1 MW SAFW D/G, 160,000 gallon Condensate Storage Tank (CST), and enclosure meeting the reasonable protection requirements of NEI 12-06.	Started (8/2013)
15. Develop and implement procedures to feed S/Gs using a SAFW Pump powered by the new SAFW D/G and taking suction on the new 160,000 CST. Revise procedures to direct Operators to manually establish makeup to the S/Gs via this flow path if the Turbine Driven Auxiliary Feedwater (TDAFW) Pump fails to deliver water to the S/Gs.	**Complete** (See the 2/2015 OIP Update Reference 4)

Ginna OIP Open Items	Status
16. Implement a design change to protect a S/G Atmospheric Relief Valve (ARV) from Tornado Missiles to address reactor core cooling and heat removal using a high capacity portable diesel driven pump.	Started (2/2015)
17. Perform an analysis to demonstrate adequate manpower, communications capability, and habitability for local operation of the S/G ARVs. If this cannot be demonstrated, implement a design change to provide for ARV control from the Control Room for seismic and tornado missile events.	**Complete** (This OIP Update 8/2015)
18. Develop and implement procedures/administrative controls to ensure that the new CST maintains a minimum usable volume at all times.	**Complete** (See the 2/2015 OIP Update Reference 4)
19. Perform an analysis or implement a design change to qualify S/G Pressure instrumentation for a Tornado Missile event.	**Complete** (This OIP Update 8/2015)
20. Identify instrumentation and develop procedures to take field readings of necessary parameters, including (Pressure Indicator) PI-430 and (Level Indicator) LI-427.	**Complete** (See the 2/2015 OIP Update Reference 4)
21. Implement a strategy to connect a portable air compressor at a location/ configuration to support ARV operation.	**Deleted** (See the 2/2015 OIP Update Reference 4)
22. Develop and implement procedures to refill the new CST from an alternate water source prior depleting the usable volume (approximately 15 hours after the event).	**Revised** (See the 2/2014 OIP Update Reference 70) **Complete** (This OIP Update 8/2015)
23. Implement a design change as part of the installation of the new CST to install a mechanical connection that will allow the tank to be refilled from a portable diesel driven pump.	**Complete** (See the 2/2015 OIP Update Reference 4)
24. Perform an analysis to establish plant conditions in Phase 1 that will allow diesel driven high capacity portable pump to be utilized as soon as plant resources are available to provide defense in depth for maintaining an adequate heat sink should SAFW fail.	Started (2/2014)
25. Implement a design change to install a new isolation valve upstream of the FLEX connection to S/G B in case a tornado missile impacts a section of unprotected piping between the SAFW Building and the connection point.	**Complete** (This OIP Update 8/2015)

Ginna OIP Open Items	Status
26. Implement a strategy to provide a sustainable source of nitrogen and/or air to the Power Operated Relief Valves (PORVs) to protect RCS Integrity during a BDBEE while in Mode 4 or Mode 5, loops filled.	**Revised** (See the 2/2014 OIP Update Reference 70) **Complete** (This OIP Update 8/2015)
27. Develop and implement procedures to provide guidance for water solid S/G cooldown using FLEX equipment.	**Deleted** (This OIP Update 8/2015)
28. Ensure NSRC can supply D/Gs capable of powering vital bus loads.	**Complete** (See the 2/2014 OIP Update Reference 70)
29. Implement a strategy to provide connections to 480 Volt vital busses to be able to connect to NSRC supplied D/Gs.	**Revised** (See the 8/2014 OIP Update Reference 63) Started (2/2015)
30. Ensure NSRC can supply a water processing unit.	**Complete** (See the 8/2014 OIP Update Reference 63)
31. Implement a design change to install low leakage Reactor Coolant Pump (RCP) seals. The new seals need to be able to withstand T_{hot} for an extended period of time.	**Deleted** (See the 2/2014 OIP Update Reference70)
32. Perform an analysis to validate that a FLEX Boric Acid Storage Tank (FBAST) with a boron concentration of at least 2750 parts per million (ppm) and no more than 3050 ppm, and containing a minimum usable volume of 7000 gallons, is sufficient to maintain the reactor subcritical at Beginning of Life (BOL) or End of Life (EOL) conditions with T_{ave} at or near no-load T_{ave}, and at EOL conditions with a cooldown to 350°F. (Analysis must be bounding for current and future cycles.)	**Deleted** (See the 2/2014 OIP Update Reference 70)
33. Implement a design change to connect a new pre-staged high pressure charging pump and FLEX diesel driven portable charging pump to the RWST.	**Revised** (See the 8/2014 OIP Update Reference 63) **Complete** (This OIP Update 8/2015)
34. Implement a strategy to batch mix boron in the FBAST.	**Deleted** (See the 8/2014 OIP Update Reference63)
35. Implement a design change to install a pump capable of pumping 75 gallons per minute (gpm) of borated water from the RWST into the RCS at 1500 pounds per square inch (psi), with discharge piping connected to the Safety Injection System.	**Revised** (See the 2/2015 OIP Update Reference 4) **Complete** (This OIP Update 8/2015)

Ginna OIP Open Items	Status
36. Develop and implement procedures to initiate RCS boration prior to commencing RCS cooldown to provide margin to prevent re-criticality.	**Complete** (This OIP Update 8/2015)
37. Implement a design change to connect a portable diesel engine driven high pressure pump to the RWST and the Safety Injection System, which is capable of pumping 75 gpm of borated water from the RWST to the RCS at 1500 psi.	**Revised** (See the 2/2015 OIP Update Reference 4) **Complete** (This OIP Update 8/2015)
38. Ensure the NSRC can supply a mobile boration unit.	**Revised** (See the 8/2014 OIP Update Reference 63) **Complete** (This OIP Update 8/2015)
39. Perform an analysis to determine minimum RCS makeup flow sufficient for simultaneous core heat removal and boron flushing for Mode 5, loops not filled and pressurizer manway not removed.	Started (2/2014)
40. Perform an analysis to determine the transition point from gravity fill of the refueling cavity to when forced makeup is required.	**Complete** (This OIP Update 8/2015)
41. For Mode 5, Loops Not Filled, and Pressurizer Manway Not Removed, RCS Heat Removal will be by RCS Bleed and Feed. Items under consideration are: • Establish RCS feed path using low pressure pump capable of [To Be Determined] gpm at > 50 psig and a maximum discharge pressure of 410 psig to the RCS. • Establish sufficient RCS bleed path (PORVs, Reactor Head Vents) • Implement a strategy to provide a connection point for Instrument Air to Containment (OI 47) • Establish feed to available S/Gs Partial strategy for consideration - Fill available S/Gs to provide limited heat sink function and additional time before boiling of the coolant occurs. Existing procedural guidance for Water Solid S/G Cooldown provides guidance that can be modified for use with a high flow portable diesel driven pump to maintain the limited heat sink function. • If Water Solid S/G Cooldown is effective to maintain core cooling and heat removal, secure RCS Bleed and Feed and maintain Pressurizer Level.	Started (2/2014)
42. Perform an analysis to determine RCS vent path requirements for Mode 5 with PORV vent path.	Started (2/2014)

Ginna OIP Open Items	Status
43. Develop and implement procedures to makeup to the refueling cavity from the new CST, UHS, or RWST to maintain refueling cavity level and boron concentration.	**Revised** (See the 8/2014 OIP Update Reference 63) **Complete** (This OIP Update 8/2015)
44. Perform a boron mixing analysis for the effects on RCS boron concentration by providing unborated water to the refueling cavity via the transfer canal from the Auxiliary Building to Containment.	**Deleted** (See the 2/2014 OIP Update Reference 70)
45. Evaluate the viability of feed and bleed for available S/Gs to provide a limited heat sink function and additional time before boiling of the coolant occurs as a parallel mitigating strategy during Modes 5 & 6. This analysis must address reflux condensation and its potential effects on reactor shutdown margin.	Started (2/2014)
46. Implement a design change to establish provisions for refilling the FBAST with borated water.	**Deleted** (See the 8/2014 OIP Update Reference63)
47. Implement a strategy to provide a connection point for Instrument Air to Containment.	**Revised** (See the 2/2014 OIP Update Reference 70) Started (2/2014)
48. Perform an evaluation to determine a method for recirculation cooling of the RCS if the Auxiliary Building Sub-basement is flooded by Tornado Missiles damaging non-protected tanks on the Auxiliary Building Operating Floor.	Started (2/2014)
49. Perform an analysis to determine the containment pressure profile during an ELAP / Loss of Ultimate Heat Sink (LUHS) event and determine the mitigating strategies necessary to ensure the instrumentation and controls in containment which are relied upon by the Operators are sufficient to perform their intended function.	**Revised** (See the 2/2014 OIP Update Reference70) Started (2/2014)
50. Perform an analysis of the containment function to determine the mitigating strategy acceptance criteria for an ELAP / LUHS event.	Started (8/2014)
51. Implement a strategy to determine containment pressure after a Tornado Missile event.	**Revised** (See the 8/2013 OIP Update Reference 71) **Complete** (See the 2/2015 OIP Update)
52. Develop the Phase 3 strategy after the containment pressure analysis is completed as described in Maintain Containment, PWR Portable Equipment Phase 2.	Started (2/2015)

Ginna OIP Open Items	Status
53. Ensure the NSRC will provide additional portable pumps and equipment to spray water into containment or supply water to the Containment Recirculation Fans / Coolers.	**Complete** (See the 8/2014 OIP Update Reference 63)
54. Implement a strategy to provide for a protected makeup connection to the Spent Fuel Pool (SFP) cooling piping to provide makeup to the SFP that exceeds SFP boil-off and provide a means to supply SFP makeup without accessing the SFP walkway.	**Revised** (See the 2/2014 OIP Update Reference 70) **Complete** (This OIP Update 8/2015)
55. Provide the necessary connecting hoses and/or equipment to work with existing pumps and water sources for filling the SFP.	**Complete** (This OIP Update 8/2015)
56. Implement new FSG-11, Alternate SFP Makeup and Cooling, to provide multiple strategies for establishing a diverse means of SFP makeup and cooling for at least 72 hours.	**Revised** (See the 8/2014 OIP Update Reference 63) **Complete** (This OIP Update 8/2015)
57. Perform an analysis to determine if a vent pathway from the SFP is needed for steam and condensate to minimize the potential for steam to cause access and equipment problems in the Auxiliary Building. (also see OI 62)	**Complete** (See the 2/2015 OIP Update Reference 4)
58. SFP Water Level instrument numbers will be provided upon detailed design completion.	**Complete** (See the 2/2014 OIP Update Reference 70)
59. Ensure the NSRC will provide additional portable pumps and equipment to: • provide water from the UHS to the Standby SFP Heat Exchanger to remove heat from the SFP cooling system with the Standby SFP Recirculation Pump; or • provide water to SFP Heat Exchanger A to remove heat from the SFP Cooling System with the Standby SFP Recirculation Pump or SFP Pump A.	**Complete** (See the 8/2014 OIP Update Reference 63) **Revised** (See the 8/2014 OIP Update Reference 63)
60. Implement a strategy to supply the battery chargers from the 1 MW D/G using existing plant equipment connection points.	**Revised** (See the 8/2014 OIP Update Reference 63) **Complete** (This OIP Update 8/2015)
61. Implement a strategy to supply the battery chargers from a 100 kW D/G using existing plant equipment connection points.	**Revised** (See the 8/2014 OIP Update Reference 63) **Complete** (This OIP Update 8/2015)

Ginna OIP Open Items	Status
62. Perform GOTHIC calculations consistent with NUMARC 87-00, *Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors*, to determine the effects of a loss of HVAC during an ELAP for the following areas: • Intermediate Building, TDAFW Pump and ARV/ (Safety Valve (SV) areas • Auxiliary Building, Refueling Water Storage Tank (RWST) area • Battery Rooms, Relay Room, and Control Room • Standby Auxiliary Feedwater Building	**Complete** (This OIP Update 8/2015)
63. Perform an analysis to evaluate the Battery Room low temperature for an ELAP event, assuming -16°F air temperature to determine if, and when, Battery Room heating is required.	**Complete** (This OIP Update 8/2015)
64. Implement a strategy for accessing the UHS for all BDBEEs and to meet required deployment times. This must also address how debris in the UHS or other raw water sources will be filtered / strained and how the resulting debris will effect core cooling.	**Revised** (See the 2/2014 OIP Update Reference 70) **Complete** (This OIP Update 8/2015)
65. Implement a strategy to provide for transferring diesel fuel from the D/G A and D/G B Fuel Oil Storage Tanks (FOSTs) to a fuel transfer vehicle.	**Revised** (See the 2/2014 OIP Update Reference 70) Started (2/2014)
66. Perform an analysis to provide a basis that the Offsite D/G FOSTs are reasonably protected from BDBEEs.	Started (8/2014)
67. Develop the strategy to transfer fuel from protected fuel storage locations to FLEX equipment.	Started (8/2014)
68. Develop strategies to provide for emergency lighting to support Operator actions after a BDBEE.	Started (2/2014)
69. Develop a strategy to protect onsite consumables for use after a BDBEE.	**Deleted** (See the 2/2015 OIP Update Reference 4)
70. Develop and implement procedures to establish battery room ventilation within 72 hours of the event to prevent exceeding the unacceptable hydrogen concentration limit of 2%, once the GOTHIC analysis has been completed as discussed in Phase 2.	**Complete** (This OIP Update 8/2015)

Ginna OIP Open Items	Status
71. Table 3 lists Phase 3 Response Equipment / Commodities that are being considered for pre-staging at an offsite location. These include: • Radiation Protection Equipment • Commodities – Food, Potable Water • Diesel Fuel • Heavy Equipment – Transportation, Debris Removal • Boric Acid • Portable Lighting • Portable Toilets	**Deleted** (See the 2/2014 OIP Update Reference70)
72. Install wide range SFP level instrumentation in accordance with NRC Order EA-12-051.	**Complete** (See the 2/2015 OIP Update Reference 4)
73. Implement a strategy to provide cooling water to the RHR Heat Exchangers using a portable diesel driven pump.	Started (2/2014)
74. Any additional non-safety equipment will be identified and evaluated for suitability in the mitigation strategies	Started (2/2014)

Table 3 provides a summary of the open and confirmatory items documented in the Ginna Interim Staff Evaluation (ISE) (Reference 27) and the open or pending items listed in the FLEX/SFPI audit report (Reference 68), and the status of each item.

Table 3
Status of Interim Safety Evaluation (ISE) Open and Confirmatory Items

ISE Open Items	Status
None	

ISE Confirmatory Items and Open or Pending FLEX/SFPI Audit Items	Status
1. **ISE Confirmatory Item 3.1.1.A** – Confirm that the licensee addresses the results of the seismic and flooding re-evaluations pursuant to the NRC's 50.54(f) letter of March 12, 2012.	**Complete** (This OIP Update 8/2015))
2. **ISE Confirmatory Item 3.1.1.1.A** – Protection, seismic - confirm that large portable FLEX equipment such as pumps and power supplies would be secured as appropriate to protect them during a seismic event and that stored equipment and structures would be evaluated and protected from seismic interactions to ensure that unsecured and/or non-seismic components do not damage the equipment.	**Complete** (This OIP Update 8/2015)
3. **ISE Confirmatory Item 3.1.1.3.A** – Procedural Interfaces – seismic - confirm that a reference source for the plant operators is provided that provides approaches to obtaining necessary instrument readings to support the implementation of the coping strategies.	**Complete** (This OIP Update 8/2015)
4. **ISE Confirmatory Item 3.1.4.2.A** – Snow, ice and extreme cold - confirm that potential loss of access to the UHS and flow path due to extreme low temperatures, e.g., due to ice blockage or formation of frazil ice, is assessed and resolved.	**Complete** (This OIP Update 8/2015)
5. **ISE Confirmatory Item 3.2.1.A** – Confirm resolution of open item to develop and implement procedures to close SI accumulator injection valves or vent the SI accumulators prior to nitrogen injection into the RCS.	**Complete** (This OIP Update 8/2015)

ISE Confirmatory Items and Open or Pending FLEX/SFPI Audit Items	Status
6. **ISE Confirmatory Item 3.2.1.B** – Consider the prioritization of staging portable equipment that may be required to isolate/vent the accumulators when certain cooldown maneuvers are necessary. The licensee's plan was to enter containment and locally close the accumulator isolation valves. The NRC staff asked for an alternate plan in case the containment building had an adverse environment. The staff requests that the licensee make available for audit their plan to isolate or vent the RCS cold leg accumulators to avoid injecting nitrogen into the RCS.	Started (2/2015)
7. **ISE Confirmatory Item 3.2.1.1.A** – Confirm completion of timelines used in conjunction with the thermal hydraulic analysis to document the duration of each phase for each critical function, and the basis for the duration.	**Complete** (This OIP Update 8/2015)
8. **ISE Confirmatory Item 3.2.1.2.A** – RCP seals - Confirm that, if RCP seals are changed to non-Westinghouse seals, the acceptability of the use of non-Westinghouse seals is addressed, and the RCP seal leakage rates for use in the ELAP analysis are provided with acceptable justification.	**Complete** (This OIP Update 8/2015)
9. **ISE Confirmatory Item 3.2.1.2.B** – Confirm that the RCP seal O-rings will maintain their integrity at the temperature conditions experienced during the ELAP event, and that the RCP seal leakage rate used in the ELAP analysis is adequate and acceptable. The staff requests that the licensee make available for audit a list of where the B type O-rings are located and an evaluation of the impact of high temperatures on those O-rings.	Started (8/2014)
10. **ISE Confirmatory Item 3.2.1.8.A** – The licensee informed the NRC staff of its intent to abide by the generic approach described in the PWROG August 15, 2013 position paper related to modeling the timing and uniformity of boric acid mixing within the RCS under natural circulation conditions potentially involving two-phase flow. Confirm that the additional conditions discussed in the NRC endorsement letter are satisfied, and that boration requirements are met.	**Complete** (This OIP Update 8/2015)
11. **ISE Confirmatory Item 3.2.1.9.A** – Confirm design information and supporting analysis developed for portable equipment that provides the inputs, assumptions, and documented analyses that the mitigation strategy and support equipment will perform as intended.	Started (8/2014)

ISE Confirmatory Items and Open or Pending FLEX/SFPI Audit Items	Status
12. **ISE Confirmatory Item 3.2.3.A** – Containment analysis - Confirm completion of containment analysis and incorporation of results into mitigation strategies.	**Complete** (This OIP Update 8/2015)
13. **ISE Confirmatory Item 3.2.4.2.A** – Ventilation - Confirm completion of GOTHIC calculations and incorporation of results into mitigation strategies.	**Complete** (This OIP Update 8/2015)
14. **ISE Confirmatory Item 3.2.4.4.A** – Emergency lighting - Confirm development of lighting strategies.	**Complete** (This OIP Update 8/2015)
15. **ISE Confirmatory Item 3.2.4.4.B** – Communications - Confirm completion of upgrades.	**Complete** (This OIP Update 8/2015)
16. **ISE Confirmatory Item 3.2.4.5.A** – Protected Area Access - Confirm that strategies are in place to allow access to protected areas as needed to execute mitigation strategies.	**Complete** (This OIP Update 8/2015)
17. **ISE Confirmatory Item 3.2.4.8.A** – Confirm that the final electrical design has the necessary electrical isolations and protections. The NRC staff determined that the auto start feature of the 1 MW FLEX DG in the SAFW Annex, which automatically energizes the bus, is an alternative to NEI 12-06, as is the use of a permanently installed FLEX DG. The staff accepted the permanent DG in the ISE review, but was unaware of the auto start feature at that time. Also, the staff needs to evaluate the connection points for the 4160V FLEX DG from the NSRC. The staff requests that the licensee make available for audit the reasons why an auto start and load feature could be an acceptable alternative to NEI 12-06, and provide a list of connection points for the 4160V FLEX DG.	**Started** (This OIP Update 8/2015) See Section 4 of this Enclosure
18. **ISE Confirmatory Item 3.3.1.A** – Confirm sufficient quantities of FLEX equipment to meet N+1, and identify their storage locations. The staff requests that the licensee make available for audit the location where each piece of FLEX equipment will be stored and the associated protection from external events at these storage locations.	Started (8/2014)

ISE Confirmatory Items and Open or Pending FLEX/SFPI Audit Items	Status
19. **Audit Item Reference AQ 1-B** – Provide information to demonstrate conformance to the storage guidance of NEI 12-06 for FLEX equipment, especially Section 7.3.1, or justify an alternative to NEI 12-06. The licensee's plan is to store N+1 equipment in a commercial building which is not fully robust. The staff requests that the licensee make available for audit a justification for using an alternative to the guidance of NEI 12-06. This configuration is a design that is used at most Exelon plants. The NRC staff previously discussed this with Exelon following the NRC FLEX audit at Byron Station. The NRC is pursuing a resolution with the licensee.	**Complete** (This OIP Update 8/2015) See Section 4 of this Enclosure
20. **Audit Item Reference SE 1-E** – The final validation and verification and timeline checks of procedures and operator actions during an ELAP need to be performed when procedures are completed. The staff is especially concerned with the timeline for initiating feedwater to the SGs. The staff requests that the licensee make available for audit the validation and verification of the procedures and timeline that shows the actions for an ELAP can be completed as planned.	Started (8/2015)
21. **Audit Item Reference SE 7-E** – In planning operator actions for ELAP, the licensee relies on an analysis of plant response using the modeling code RELAP5/MOD3.3. The NRC staff needs to evaluate the results obtained by the licensee. No input is needed at this time. The NRC staff will evaluate the licensee's results.	Started (8/2015)
22. **Audit Item Reference SE 11-E** – Discuss all areas where local manual actions are performed and evaluate the ability to perform these tasks based on local conditions such as heat, cold, humidity, radiation, lighting, and communications. The NRC staff requests that the licensee make available for audit a list of all local manual actions and evaluate if the conditions allow for the task to be accomplished in accordance with the event timeline.	Started (8/2015)
23. **Audit Item Reference SE 12-E** – Discuss strategies involving RCS makeup and boration to verify shutdown margin is maintained and methods of venting the RCS to permit injection flow. The NRC staff requests that the licensee make available for audit an evaluation of shutdown margin and the ability to inject borated water into the RCS without taking the pressurizer solid.	Started (8/2015)

ISE Confirmatory Items and Open or Pending FLEX/SFPI Audit Items	Status
24. **Audit Item Reference SE 13-E** – Provide justification for the ability of the RCP seals to limit the leakage from the RCS during ELAP conditions to the leakage values assumed in the plant analyses. The staff acknowledges that this is applicable to all pressurized-water reactors with standard Westinghouse RCP seals. The staff has pursued this with the Pressurized-Water Reactor Owners Group without reaching a resolution. The NRC staff requests that the licensee make available for audit an evaluation of compensatory margins in the analysis that could compensate in the event that RCP seal leakage is greater than assumed in the analysis.	Started (8/2015)
25. **Audit Item Reference SE 14-E** – Determine if all components in the RCP seal leakoff line that function to limit seal leakage flow are capable of withstanding the pressure predicted during an ELAP event, or evaluate the new leakage flow that would result from a failure of the seal leakoff line. No input is needed at this time. The NRC staff will evaluate the licensee's response.	Started (8/2015)
26. **Audit Item Reference SE 16-E** – Provide the plan for maintenance and testing of FLEX equipment which conforms to the guidance of NEI 12-06, Section 11.5. The NRC staff understands that Exelon is preparing a corporate response to this issue. Please provide the corporate response, and any specific maintenance and testing requirements for your specific FLEX equipment.	**Complete** (This OIP Update 8/2015) See Section 4 of this Enclosure
27. **Audit Item Reference SE 17-E** – RCS injection does not have primary and alternate injection points as specified by NEI 12-06, Section 3.2.2 and Table D-1. The NRC staff requests that the licensee make available for audit a strategy for RCS injection that conforms to NEI 12-06, or provides justification for an alternative to NEI 12-06.	Started (8/2015)
28. **Audit Item Reference SE 18-E** – The portable FLEX SG injection pump does not have primary and alternate injection points to the SGs as specified by NEI 12-06, Section 3.2.2 and Table D-1. The NRC staff requests that the licensee make available for audit a strategy for SG injection that conforms to NEI 12-06, or provides justification for an alternative to NEI 12-06.	**Complete** (This OIP Update 8/2015) See Section 4 of this Enclosure

7 Potential Interim Safety Evaluation Impacts

There are no potential impacts to the Interim Safety Evaluation as this time.

8 References

The following references support the updates to the OIP described in this attachment.

1. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), "Overall Integrated Plan for Mitigation Strategies for Beyond-Design-Basis External Events," dated February 28, 2013 (FLL-13-007).
2. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.
3. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), "Supplement to Overall Integrated Plan for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 8, 2013 (FLL-13-015).
4. Letter from M. G. Korsnick (EGC) to Document Control Desk (NRC), "February 2015 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 20, 2015 (RS-15-061).
5. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," dated August 2012.
6. UFSAR, "Updated Final Safety Analysis Report," Revision 25
7. ATT-5.5, "Attachment SAFW with Suction from DI Water Storage Tank during SBO," Revision 00000
8. Dwg-33013-1238, "Standby Aux Feedwater P&ID," Revision 034
9. FSG-6, "Alternate SAFW DI Water Storage Tank Makeup," DRAFT 7/10/2015
10. FSG-3, "Alternate Low Pressure Feedwater," DRAFT 7/23/2015
11. FSG-1, "Long Term RCS Inventory Control," DRAFT 7/24/2015
12. FSG-8, "Alternate RCS Injection," DRAFT 7/24/2015
13. ECP-14-000169-CN-090, "Alternate Charging System," Revision 0000
14. FSG-11, "Alternate SFP Makeup and Cooling," DRAFT 7/10/2015
15. 33013-1248, "Auxiliary Cooling Spent Fuel Pool Cooling P&ID," Revision 041
16. FSG-4, "ELAP DC Bus Load Shed/Management," DRAFT 7/13/2015
17. 33013-3131, "480 VAC Single Line Diagram SAFW & NFPA805 1000KW Standby Diesel Generator Sets," Revision 003
18. 33013-2539, "AC System Plant Load Distribution One Line Wiring Diagram," Revision 028
19. ER-SC.2, "High Water (Flood) Plan," Revision 01001

20. DA-ME-14-003, "Fukushima Fuel Consumption Analysis," Revision 1
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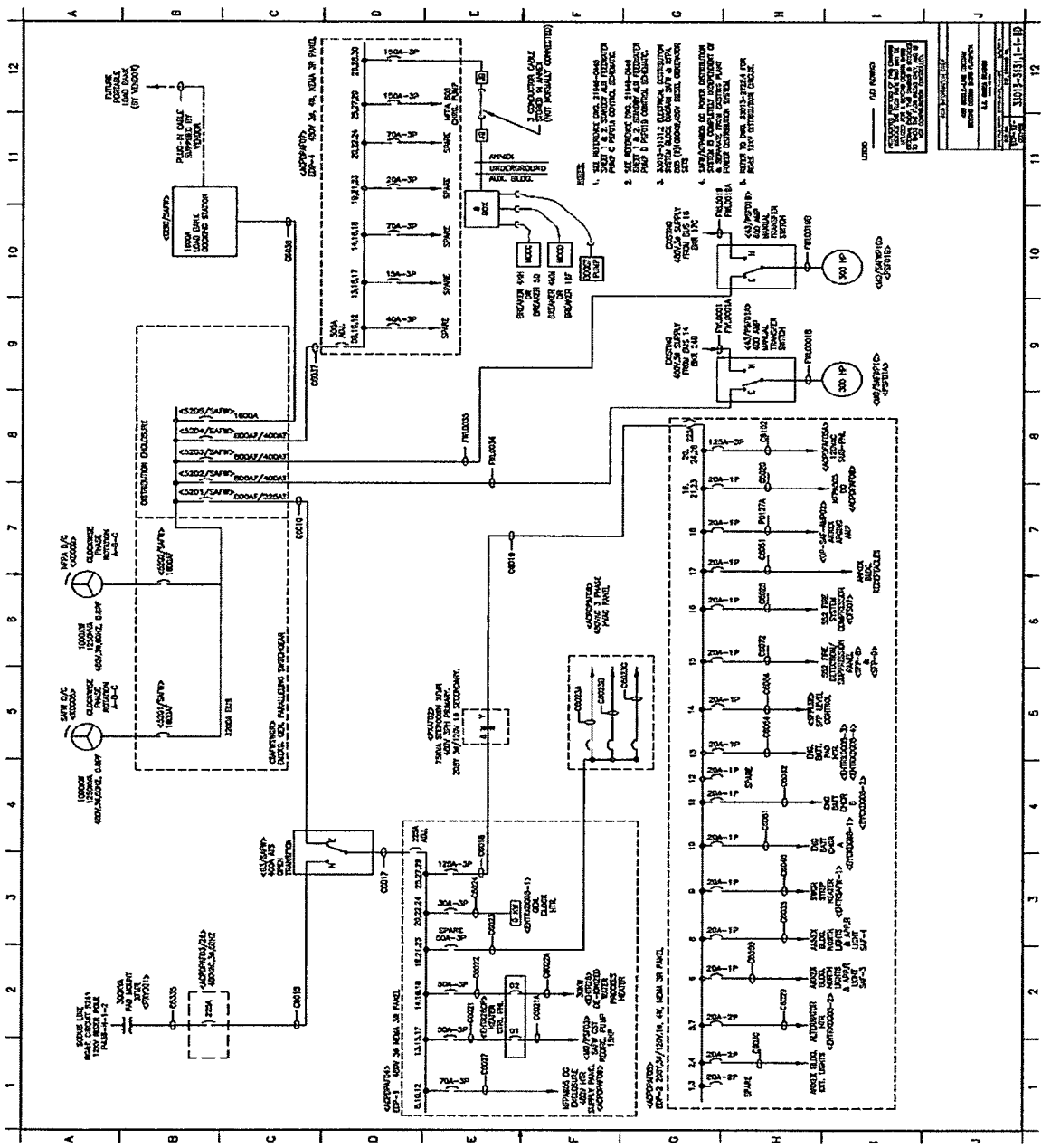
Figure 1: 480 VAC Single Line Diagram BDBEE Flow Path



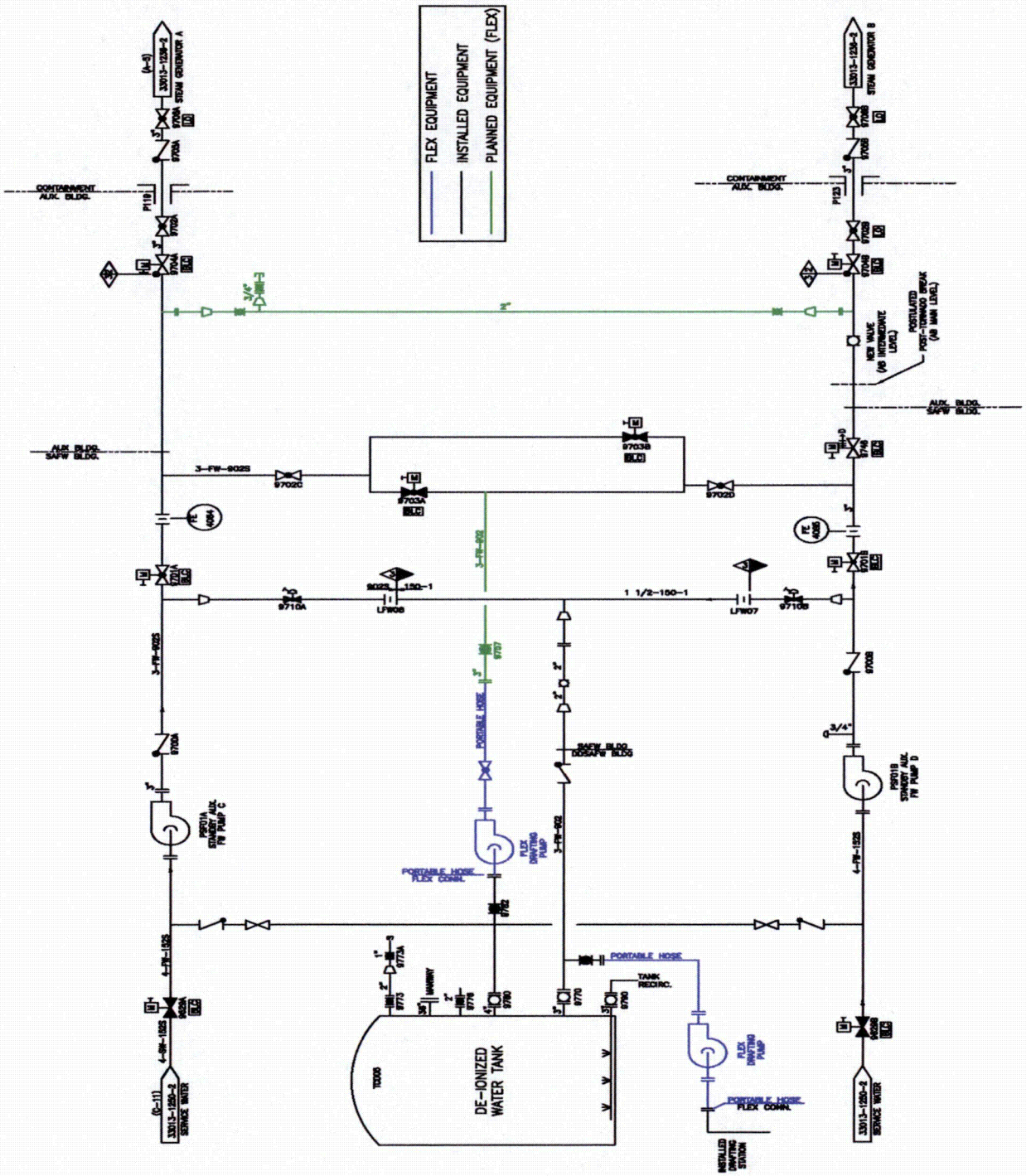


Figure 2: FLEX SAFW System Pumps and Connections