J. Todd Conner
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DTE Energy

February 27, 2014
NRC-14-0002

10 CFR 2.202

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

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) NRC Order EA-12-049, "Order to Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012

3) 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 Events," Revision 0, dated August 29, 2012

4) NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012

5) DTE Electric Company letter, NRC-12-0061, "Detroit Edison's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated October 19, 2012

6) DTE Electric Company letter, NRC-13-0009, "DTE Electric 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

Subject: DTE Electric Company's Second Six Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 2) to DTE Electric Company (DTE). Reference 2 was immediately effective and directed DTE 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-bases external event. Specific requirements are provided in Attachment 2 of Reference 2.

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

Reference 2 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 4 provides direction regarding the content of the status reports. The purpose of this letter is to provide the second six-month status report pursuant to Section IV, Condition C.2, of Reference 2, that delineates progress made in implementing the requirements of Reference 2. Enclosure 1 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. In addition, a revision of the overall integrated plan previously submitted in Reference 6 is also provided in Enclosure 2. A summary of the overall integrated plan revision is included in Section 4 of the status report (Enclosure 1).

This letter contains no new regulatory commitments.

Should you have any questions or require additional information, please contact Mr. Kirk R. Snyder, Manager, Industry Interface at (734) 586-5020.

Sincerely,

Enclosures

cc: Director, Office of Nuclear Reactor Regulation
NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Michigan Public Service Commission,
Regulated Energy Division (kindschl@michigan.gov)

I, J. Todd Conner, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

J. Todd Conner
Site Vice President
Nuclear Generation

On this 27th day of February, 2014 before me personally appeared J. Todd Conner, being first duly sworn and says that he executed the foregoing as his free act and deed.

Sharon S. Marshall
Notary Public

SHARON S. MARSHALL
NOTARY PUBLIC, STATE OF MI
COUNTY OF MONROE
MY COMMISSION EXPIRES Jun 14, 2019
ACTING IN COUNTY OF Monroe

Enclosure 1 to
NRC-14-0002

Fermi 2 NRC Docket No. 50-341
Operating License No. NPF-43

DTE Electric Company's Second 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

DTE Electric Company's Second 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

DTE Electric Company (DTE) developed an Overall Integrated Plan (OIP) (Reference 6), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides an update of milestone accomplishments since submittal of the last six-month update, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2. Milestone Accomplishments

None

3. Milestone Schedule Status

The following provides an update to the milestone schedule to support the Overall Integrated Plan. Target completion dates provided in this section include updates from previous six-month updates. This section provides the activity status of each item, and the expected completion date. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	Oct 2012	Complete (Reference 5)	
Submit Overall Integrated Plan	Feb 2013	Complete (Reference 6)	
Submit 6 Month Updates:			
Update 1	Aug 2013	Complete (Reference 7)	
Update 2	Feb 2014	Complete	
Update 3	Aug 2014	Not Started	
Update 4	Feb 2015	Not Started	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Update 5	Aug 2015	Not Started	
FLEX Strategy Evaluation			
Walk through or Demonstrations	Aug 2016	Not Started	
Perform Staffing Analysis	Jul 2015	Not Started	
Modifications:			
Design Engineering	Dec 2014	In-progress	
Implementation Outage	Nov 2015	Not Started	
Storage			
Storage Design Engineering	Dec 2014	In-progress	
Storage Implementation	Nov 2015	Not Started	
FLEX Equipment			
Procure On-Site Equipment	Aug 2014	In-progress	
Develop Strategies with RRC	Nov 2014	In- progress	Feb 2015
Procure Staging Location	Dec 2013	In-progress	Apr 2015
Procedures:			
Create Procedures	Dec 2014	Not Started	
Training:			
Develop Training Plan	Jul 2015	Not Started	
Training Complete	Nov 2015	Not Started	
FLEX Implementation	Nov 2015	Not Started	
Submit Completion Report	Jan 2016	Not Started	

4. Changes to Compliance Method

The following changes have been made in the compliance method for Fermi 2.

- The strategy for restoration of DC power has been changed to rely on restoration of battery chargers powered by supplemental AC generators. Previous plans called for supplemental DC generators.

- A means to vent the Reactor Building 5th floor (RB-5) has been added to the Fermi 2 strategy

Revision 1 of the Fermi 2 Overall Integrated Plan for compliance with Order EA-12-049 is attached as Enclosure 2 to this report. Revision 1 reflects the changes to the Fermi 2 compliance method described above and the changes described in the status of open items provided in Section 6 below. In addition, Revision 1 includes:

- Updates to the time frames specified for expected plant response or operator actions to reflect more recent evaluations. These changes do not change the conclusion that Fermi 2 can successfully respond to the postulated events.
- More specific discussion of the primary credited success path as opposed to secondary defense-in-depth options, such as specifying that indefinite operation using phase 2 equipment is the primary success path.
- Fermi 2 conformance to the NRC endorsed NEI position paper entitled "Shutdown/Refueling Modes."
- Updates to reflect that FLEX storage buildings will be located near the location of expected use of the stored equipment.
- Revisions to clarify that alternative sources for instrument readings will be provided in procedures.
- Revisions to provide more detail concerning the plans for equipment delivery from off-site resources.
- Revisions to clarify that station procedure verification and validation processes will used to validate that actions can be accomplished in the necessary timeframes.
- Revisions to provide more details concerning pathway clearance equipment.
- Revisions to state that the Modular Accident Analysis Program (MAAP4) analysis will meet the criteria and use limitations of the NRC staff letter to NEI dated October 3, 2013.
- Revisions to provide more detail concerning the plans for programmatic controls.
- Updates to references and other minor editorial changes.

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

DTE expects to comply with the order implementation date and no relief/relaxation is required at this time.

6. Open Items from Interim Staff Evaluation

The following table provides a summary of the open items documented in the Interim Staff Evaluation (ISE) (Reference 8) and the status of each item.

ISE Open Item	Status
3.1.1.1.A. Each section of the Integrated Plan describing storage protection from hazards makes reference to Section 11 rather than to the specific protection requirements described in NEI 12-06 for the applicable hazard; that is Section 6.2.3.1 for floods, Section 7.3.1 for wind, etc.	The OIP has been revised to refer to the specific requirements of NEI 12-06
3.2.2.A Until the issue of relying on blow-away panels to prevent [over] pressurization of the RB-5 is provided there is no reasonable assurance that the plan will conform with NEI 12-06, Table C-3.	Means to vent RB-5 have been added to the Fermi 2 strategy and the OIP has been revised accordingly.
3.2.3.B Revision 3 to the BWROG EPG SAG is a Generic Concern because the BWROG has not addressed the potential for the revised venting strategy to increase the likelihood of detrimental effects on containment response for events in which the venting strategy is invoked. [Note: For Fermi, containment venting is a backup plan to torus feed and bleed discussed above.]	The NRC generic concerns with the revised venting strategy contained in Revision 3 to the BWROG EPG SAG have been resolved. This venting strategy is being incorporated into the Fermi 2 Emergency Operating Procedures. Use of containment venting is noted in the revised OIP as back-up to the primary strategy.

7. References

1. Fermi 2
   NRC Docket No. 50-341
   NRC License No. NPF-43
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.
3. 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 Events," Revision 0, dated August 29, 2012
4. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
5. DTE Electric Company letter, NRC-12-0061, "Detroit Edison's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated October 19, 2012

6. DTE Electric's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," NRC-13-0009, dated February 28, 2013.
7. DTE Electric Company letter, NRC-13-0044, "Detroit Edison's First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated October 19, 2012
8. NRC Letter, "Fermi, Unit 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC No. MF0770), dated November 25, 2013

Enclosure 2 to NRC-14-0002

Fermi 2 NRC Docket No. 50-341
Operating License No. NPF-43

Fermi 2 FLEX Overall Integrated Plan
February 2014 Update

General Integrated Plan Elements (PWR & BWR)	
Determine Applicable Extreme External Hazard **Ref: NEI 12-06 section 4.0 -9.0** **JLD-ISG-2012-01 section 1.0**	*Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps. Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant screened out for certain hazards.*

The hazards applicable to Fermi are seismic, external flood, high winds, snow, ice, and cold and high temperature.

NEI 12-06 Section 5: Assess Seismic Impact

NEI 12-06 states the FLEX deployment strategy will address seismic hazards at all sites. The Fermi site is located in one of the seismically stable regions in the United States, and no earthquake epicenter has been located closer than 25 miles (UFSAR Section 2.5.2.5.1). The Reactor Building, which houses the drywell, suppression chamber, refueling and reactor servicing equipment, and the Spent Fuel Pool (SFP), consists of reinforced concrete and structural steel supported on the Reactor Building foundation mat (UFSAR Section 3.8.4.1.1.1). The Auxiliary Building (which is part of the same structure as the Reactor Building) houses several major safety-related systems and components and consists of reinforced concrete and structural steel supported on a reinforced concrete mat. The Auxiliary Building is separated from the Turbine Building by a four inch seismic rattle space (UFSAR Section 3.8.4.1.1.2). Finally, the Residual Heat Removal (RHR) Complex is a reinforced concrete structure supported on a base mat that serves as the Ultimate Heat Sink (UHS) for the reactor during normal shutdown. The complex is divided into two divisions, each with the capacity to safely shut down the reactor during normal and accident conditions (UFSAR Section 3.8.4.1.2).

These three Seismic Category I structures, as well as all seismic Category I structures, were modeled as slab-spring systems with lumped masses. The slabs are treated as infinitely rigid in their own planes and are interconnected by weightless, linear elastic spring, used to simulate the stiffness of shear walls within the structural system. These mathematical models were dynamically analyzed to determine the seismic response loads on structural components (UFSAR 3.7.2.1.2.2).

Seismic hazards are applicable at Fermi Station.

NEI 12-06 Section 6: Assess External Flooding Impact

Fermi Station is not a "dry site." Section 1.2.2.3.5 of the UFSAR states that site grade at Fermi is at 583 ft. The maximum stillwater elevation, based on the probable maximum meteorological event is 586.9 ft. All category I seismically qualified structures are flood protected (waterproofed) to an elevation of 588 ft. The RHR Complex is watertight to an elevation of 590 ft.

The maximum flooding would be due to a storm surge during the maximum monthly mean lake level (UFSAR Section 2.4.3). There is no upstream dam (UFSAR Section 2.4.14.2), and Fermi Station is not susceptible to a tsunami (UFSAR 2.4.6). Any low-amplitude seiche that could occur would be of negligible concern to the site (UFSAR

2.4.6). The maximum duration of a flooding event is estimated to be 17 hours (UFSAR Section 2.4.5.4.2.3).

Flooding hazards are applicable at Fermi Station.

NEI 12-06 Section 7: Assess Impact of Severe Storms with High Winds

Fermi Station is not susceptible to hurricanes due to location (reference figure 7-1 of NEI 12-06). According to the UFSAR, all Category I classified structures are able to withstand a design basis tornado with wind velocities of 300 mph (UFSAR Section 3.3.2.1).

Based upon the location of the site at 41 57' N and 83 15'W and the information provided in Figure 7-2 of NEI 12-06, wind speeds at Fermi 2 may exceed 130 mph.

Therefore, high winds due to tornados are applicable at Fermi Station.

NEI 12-06 Section 8: Assess Impact of Snow, Ice and Extreme Cold

According to NEI 12-06 figure 8-2, Fermi Station is susceptible to Level 5 ice severity. This is a catastrophic destruction of power lines and/or existence of extreme amounts of ice. The greatest ice accumulation on record is three inches (UFSAR 2.3.1.3.5). The lowest temperature on record was -19° F (UFSAR 2.3.1.2).

Extreme snow, ice, and cold are applicable at Fermi Station.

NEI 12-06 Section 9: Assess Impact of High Temperatures

NEI 12-06 states that all sites must consider high temperatures. The issues here are similar to cold and ice in that the equipment must be sufficiently protected from the high temperatures so that it will still be able to function when necessary. The highest temperature ever recorded at the Fermi site was 105° F (UFSAR 2.3.1.2)

High temperatures are applicable at Fermi Station.

Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • *Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes.* • *Exceptions for the site security plan or other (license/site specific) requirements of 10CFR may be required.* • *Deployment resources are assumed to begin*

	arriving at hour 6 and fully staffed by 24 hours. • *Certain Technical Specifications cannot be complied with during FLEX implementation.*

Key assumptions associated with implementation of FLEX Strategies:

- Flood and seismic walk downs and associated analysis reports (References 2 and 3) are completed and have confirmed there is no impact to the Systems, Structures or Components (SSCs) relied upon for implementing the proposed FLEX strategies.
- The initial condition is assumed to be a loss-of-offsite power event with no prospect for recovery of off-site power for an extended period of time.
- All installed sources of emergency AC power and Station Black-Out (SBO) alternative AC power sources are assumed to be not available and not imminently recoverable.
- The following conditions exist:
  - Safety related SSCs relied on in these strategies are available and protected from external hazards.
  - Plant initial response is the same as SBO (20.300.SBO procedure).
  - Entry to Extended Loss of AC Power (ELAP) will be within 45 minutes.
  - Modular Accident Analysis Program (MAAP4) analysis for decay heat is used to establish maximum operator response timelines and actions (Reference 7). The analyses will meet criteria and use limitations specified in NRC staff letter to NEI dated October 3, 2013
  - No single failure of an SSC is assumed beyond those specified in NEI 12-06.
  - Flood duration will be 17 hours (UFSAR Section 2.4.5.4.2.3).
  - There will be early warning for a flooding event (NEI 12-06 Section 6.2.2). Flood warning would initiate a reactor shutdown and plant cool down (Abnormal Operating Procedure (AOP) 20.000.01, Acts of Nature).
- The FLEX connections will either be hardened or in diverse locations to ensure connections are available following the event.
- Decay heat is based on ANSI/ANS 5.1, 1979 evaluation methods (Reference 4, Chapter 6.2). This bounds the NEI 12-06 specified power history of 100 days at 100% power
- AC on site distribution system, DC on site distribution system and batteries are available based on design standards and location in Seismic Category 1 structures (Reference 5, 3.2.1.3 (8))
- Implementation strategies are assessed for hazards impact.
- All Phase 2 components are stored on site and available for FLEX.
- Additional staff resources are expected to arrive to the site beginning at 6 hours, and the site will be fully staffed 24 hours after the event per Section 2.2 sub item 4 of NEI 12-06.
- The Condensate Storage Tank (CST), if available, will be used in the FLEX strategy (Reference 5, Section 3.2.2 item 5).
- Recirculation pump seal leakage is an expected reactor coolant inventory loss and is included in the containment analysis (Reference 5, Section 3.2.1.5).
- All Phase 3 components will be available consistent with considerations of Section 3.3 of NEI 12-06.
- The FLEX equipment in Phase 2 will be capable of coping for an indefinite

period.

- Instrumentation for key parameters specified in this plan is powered from Engineered Safety Feature (ESF) DC. This ESF DC is available in Phase 1 and restored in Phase 2 electrical actions.

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

References:

1) AOP 20.300.SBO, Rev 18, "Loss of Offsite and Onsite Power"
2) NRC-12-0076 Fermi 2 NPP External Flooding Walkdown Report, November 9, 2012
3) TMPE-12-0294 Fermi 2 NPP Seismic Walkdown Report, Rev 0
4) Fermi 2 Updated Final Safety Report, Rev 18
5) NEI 12-06, Rev 0 "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". (NRC Accession No. ML12221A205)
6) AOP 20.000.01, Acts of Nature
7) Preliminary DTE MAAP Analysis Runs, "Fermi 2 FLEX Coping Time Evaluation", and "Series 600 Cases for Fermi 2 FLEX MAAP Scoping Time Analysis" Reference letter NJPR-13-0028 dated March 27, 2013
8) Task Interface Agreement (TIA) 2004-04, "Acceptability of Proceduralized Departures from Technical Specifications (TSs) Requirements at the Surry Power Station," (TAC Nos. MC4331 and MC4332)," dated September 12, 2006. (Accession No. ML060590273)

Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01** **NEI 12-06 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.*

Fermi Station had previously communicated an intention to take exception to certain attributes required by NEI 12-06 Table C-3.

The integrated strategy under development now includes provisions to meet Table C-3 attributes. Thus, Fermi Station does not anticipate crediting any strategies that constitute deviations to the guidelines in JLD-ISG-2012-01 and NEI 12-06. If, during resolution of open audit or Interim Staff Evaluation items, this position changes, the formal deviations will be communicated in a future OIP update.

Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7** **JLD-ISG-2012-01 section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walkthrough of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A.* *See attached sequence of events timeline (Attachment 1A).* *Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B).*

A preliminary MAAP analysis (Reference 1) has been performed to determine key parametric values versus time. A table-top exercise showed that these actions can be accomplished in the required time frames (Reference 18). These will be validated, using the procedure validation/verification process once all procedures, training, and equipment have been implemented.

1. Enter Extended Loss of AC Power (ELAP) within 45 minutes and begin installing FLEX equipment. Determination of an ELAP condition within 45 minutes is reasonable based on the actions in AOP 20.300.SBO (Reference 5) for operators to start/evaluate standby AC sources. The Emergency Response organization (ERO) would also be required to evaluate the loss of AC under procedure EP-101, "Classification of Emergencies" (Reference 16). Maximum time to declare the Emergency as a General Emergency (GE) is four hours based on Initiating Condition (IC) SG1. These are time sensitive actions.
2. DC load shedding (Reference 7) must be accomplished for the strategies of containment heat removal, Safety Relief Valve (SRV) operation, and monitoring of required instrumentation. This is a time sensitive action. DC battery voltage drops below the minimum required to sustain the necessary loads at

approximately 8 hours (Reference 6).

3. Interim load shedding and restoration of battery chargers from a FLEX Phase 2 AC electrical generator must be accomplished before the DC battery voltage drops below the minimum voltage required to maintain necessary loads. DC is required for containment heat removal and monitoring of required instrumentation. (Reference 7) This is a time sensitive action.
4. Drywell Pressure control in response to Reactor Recirculation Pump (RRP) leakage (assumed at 41 gpm) is accomplished with FLEX Phase 2 AC generators installed within 4 hours. Operators use these FLEX Phase 2 AC generators to power up and close required Reactor Recirculation Isolation valves to isolate the potential RRP seal leak(s). With these actions, exceeding the Pressure Suppression Pressure (PSP) can be avoided (References 8, 9, 10). This would avoid forced Reactor Pressure Vessel (RPV) depressurization using the SRVs. This is a time sensitive action.
5. Preliminary MAAP run DTE_0210 shows the earliest time for exceeding Reactor Core Isolation Cooling (RCIC) suction temperature limit (240F) is approximately 10 hours. Prior to reaching the temperature limit, FLEX equipment will be installed to reduce Torus temperature to maintain oil temperatures for continued RCIC operations AND to provide for containment heat removal. A feasibility study will be performed to ensure station personnel can deploy FLEX equipment prior to this point. If installed by 5 hours, the projected Torus temperature in Preliminary MAAP run DTE_605 would not exceed 190 F. This is a time sensitive action.
6. Preliminary MAAP run DET_001 shows Torus temperature impact without the credited and analyzed feed and bleed heat removal. Use of the Hardened Containment Vent System (HCVS) to remove containment heat is not credited or analyzed for beyond design bases event response, and will be initiated as directed in the Emergency Operating Procedures.
7. For a recent full core offload, water in the Spent Fuel Pool (SFP) begins to boil after 4.2 hours with a maximum boiling water loss rate of 90.77 gpm (Reference 11). Using the Spent Fuel Pool Dimensions of 34' x 40' (Reference 11), the boiling water loss rate is equal to approximately 6 inches per hour. From the time of the event, current bounding time frame shows there will be a minimum of 28 hours until ten feet above top of the racks is reached, and FLEX pumps must be in place to provide makeup to the SFP. Installation of the FLEX water sources is required for RPV makeup and containment heat removal in time frames much less than this 28 hour period (see above). This is NOT a time sensitive activity.
8. Preliminary MAAP DTE_0605 analysis (Reference 1) shows that the drywell temperature and pressure limits will not be exceeded.

References

1. Preliminary DTE MAAP Analysis Runs, "Fermi 2 FLEX Coping Time Evaluation", and "Series 600 Cases for Fermi 2 FLEX MAAP Scoping Time Analysis" Reference letter NJPR-13-0028 dated March 27, 2013
2. EOP 29.100.01, Sheet 2, Revision 12, "Primary Containment Control"
3. EOP 29.100.01, Sheet 3, Revision 9, "RPV Flooding, Emergency

Depressurization and Steam Cooling"
4. EOP 29.100.01 Sheet 6, Revision 15, "Curves, Cautions, and Tables"
5. AOP 20.300.SBO, Revision 18, "Loss of Offsite and Onsite Power"
6. Study Number 29827-1050-17-Study-001, Evaluation of Battery Coping Time for an Extended Loss of AC Power Event, letter NJPR-13-0018 dated March 27, 2013.
7. Emergency Support Procedure (ESP) 29.ESP.EXTSBO, Revision 0 "Extended SBO"
8. SOP 23.138.01, Revision 106 "Reactor Recirc System"
9. Alarm Response Procedure (ARP) 3D145, Revision 10 "Recirc Pump B – Outer Seal Leakage High"
10. ARP 3D121, Revision 9 "Recirc Pump A – Outer Seal Leakage High"
11. Calculation HI-992207, "Bulk SFP Thermal-Hydraulic Analyses for Reracking of Fermi Unit 2," Rev 5
12. EDM 29.EDM.17, Revision 0, "Suppression Pool Cooling"
13. EDM 29.EDM.18, Revision 0, "Water Management
14. EDM 29.EDM.13, Fuel Management"
15. NEI 12-06, Rev 0 "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide". (NRC Accession No. ML12221A205)
16. Radiological Emergency Response Implementing Procedure EP-101, Revision 38, "Classification of Emergencies"
17. NRC Order EA-13-109, "Reliable Hardened Containment Vents.."
18. TMII-13-0001, "Nexus/Fermi Tabletop of FLEX strategies"

Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes.*

Equipment staging locations and deployment paths for support equipment shown in Figure 1 are to be utilized to connect FLEX equipment. A liquefaction study will be performed to validate there will be no soil liquefaction along the proposed staging locations and deployment paths due to a seismic event. The identified paths and deployment areas will be accessible during all modes of operation. This deployment strategy will be included within a site administrative program in order to keep pathways clear or actions to clear the pathways. Redundant equipment to facilitate clearing of required pathways [large commercial vehicles equipped with blades and other recovery equipment] will be stored in protected facilities and be available for use. No flood barriers or post flood dewatering pumps are required for FLEX implementation locations.

Select FLEX equipment will be maintained available during times when the plant is shutdown or refueling. Fermi 2 will incorporate the supplemental guidance provided in the NEI position paper entitled "Shutdown / Refueling Modes" to enhance the shutdown risk process and procedures.

Provide a milestone schedule. This schedule should include: • **Modifications timeline**	*The dates specifically required by the order are obligated or committed dates. Other dates are*

○ **Phase 1 Modifications** ○ **Phase 2 Modifications** ○ **Phase 3 Modifications** • **Procedure guidance development complete** ○ **Strategies** ○ **Maintenance** • **Storage plan (reasonable protection)** • **Staffing analysis completion** • **FLEX equipment acquisition timeline** • **Training completion for the strategies** • **Regional Response Centers operational** **Ref: NEI 12-06 section 13.1**	*planned dates subject to change. Updates will be provided in the periodic (six month) status reports.* *See attached milestone schedule Attachment 2.*
See attached milestone schedule in Attachment 2.	

Identify how the programmatic controls will be met. **Ref: NEI 12-06 section 11** **JLD-ISG-2012-01 section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06.Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section. See section 6.0 of JLD-ISG-2012-01.*

Fermi Station will comply with Section 11 of NEI 12-06.

Fermi Station will implement a FLEX administrative program document that contains requirements for control of configuration and supporting analyses.

Fermi Station will implement appropriate technical documents validating that mitigation strategies and support equipment will perform as intended. These will be controlled within the configuration document control system.

Fermi station will implement FLEX Support Guidelines (FSG) defining available, pre-planned FLEX strategies for accomplishing specific tasks. FSGs will be integrated with, and support, EOP, EDMG, and SAMG strategies.

FLEX equipment will be dedicated and will have unique plant identification numbers as appropriate.

FLEX equipment will be specified & procured in accordance with the NEI 12-06 guidelines.

Installed structures, systems, and components pursuant to 10CFR50.63(a) will continue to meet the augmented quality guidelines of Regulatory Guide 1.155, "Station Blackout."

Fermi Station will establish PMs for the FLEX related components based on industry technical requirements. Testing procedures will be developed and frequencies established based on equipment type and considerations in applicable EPRI and NEI 12-06 guidelines.

Fermi Station will assess the addition of appropriate program descriptions into the UFSAR, Technical Requirements Manual, and other license basis documents, in alignment with industry and regulatory practice.

The FLEX administrative program will ensure FLEX routes are maintained available for use.

Describe training plan	*List training plans for affected organizations or describe the plan for training development*
Training elements of the FLEX order will be performed using a systematic approach to training. All training will be completed prior to startup from refueling outage 17 (no later than November 2015). Fermi Station will comply with Section 11.6 of NEI 12-06.	

Describe Regional Response Center plan	*Discussion in this section may include the following information and will be further developed as the Regional Response Center development is completed.* ▪ *Site-specific RRC plan* ▪ *Identification of the primary and secondary RRC sites* ▪ *Identification of any alternate equipment sites (i.e. another nearby site with compatible equipment that can be deployed)* ▪ *Describe how delivery to the site is acceptable* ▪ *Describe how all requirements in NEI 12-06 are identified*
The industry has established two (2) Regional Response Centers (RRCs) to support utilities during beyond design basis events. Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local assembly area, established by the Strategic Alliance for FLEX Emergency Response (SAFER) team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request. Prior to implementation, DTE will have contracts established with the RRC for delivery of equipment appropriate for the station's Phase 3 strategy. The program will be administered by the site-specific playbook, which is currently under development. Fermi Station is designating staging areas for delivery of Phase 3 SAFER Equipment, including a local staging area approximately 28 miles from the site, an on-site staging area, and specific equipment deployment locations. Procedures and processes are under development to manage: Regional Response deployment request, land and air deployment methods; primary and alternate transportation routes; assessment of travel route viability & restoration of travel path availability; deployment from staging areas to the site, including access requirements; process and procedures for connection and operation of Phase 3 equipment. Fermi Station is actively engaged with the vendor managing the SAFER program, and the vendor managing equipment procurement. Equipment specification and procurement are in progress, and will be completed to support the FLEX final implementation date of November 2015.	

These actions, when completed , will fully implement NEI 12-06 sections 3.2.2 and 12.

Maintain Core Cooling	
Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **RCIC/HPCI/IC** • **Depressurize RPV for injection with portable injection source** • **Sustained water source**	
BWR Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC) and strategy(ies) utilized to achieve this coping time. RCIC will be used to maintain core cooling by injecting into the RPV. RCIC will take suction from either the CST, if available, or the Torus [credited source]. High Pressure Coolant Injection (HPCI) will also be operating, if sufficient steam pressure is available, to control reactor pressure so that the SRVs do not need to be operated. Before HPCI is brought into service, SRV actuation is available. Fermi does not rely on blackstart capability of RCIC, though that capability exists (NRC SER, "Fermi 2 Conforming License Amendment to Incorporate the Mitigation Strategies Required by Section B.5.b of Commission Order EA-02-026 and the Radiological Protection Mitigation Strategies Required by Commission Order EA-06-137 (TAC No. MD4S32)", dated August 23, 2007).	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
The following proposed procedures are being developed or revised: • The operation of RCIC/HPCI will be governed by System Operating Procedure (SOP) 23.206 (RCIC) and 23.202 (HPCI) for RPV injection (RCIC) and minimum flow mode (HPCI) respectively. • The AOP 20.300.SBO, "Loss of Offsite and Onsite Power," procedure is being modified with a condition to go to the extended SBO procedure (29.ESP.ExtSBO), and actions to reduce DC loading will be added to AOP 20.300.SBO. • The 29ESP.ExtSBO, "Extended SBO", procedure will cover DC load shedding and provides a cross reference to available instrumentation/power sources and redundant instrumentation/power supplies. A listing of local instruments that are power independent AND methods to monitor key parameters using locally connected meters will also be supplied in this procedure.	
Identify modifications	*List modifications*

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

- No Modifications required.

Key Reactor Parameters	*List instrumentation credited for this coping evaluation.*	
Parameters	**Transmitter PIS #**	**Indication PIS #**
Reactor water level – wide range	B21-N091B/C	B21-R623A/B
Reactor Pressure – wide range	B21-N051A/B	B21-R623A/B
RCIC suction	E51-R002	E51-R609
RCIC discharge	E51-R001	E51-R609

Maintain Core Cooling

BWR Portable Equipment Phase 2:

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC) and strategy(ies) utilized to achieve this coping time.

Two diesel driven pumps in series will move water from the FLEX water sources (preferred suction is the Circulating Water Pond) into the Reactor Building and into the RHR system for RPV injection. The lift pump is a 3,000 gpm, 150 psi pump capable of taking water from the FLEX water source and boosting pressure for transit to a second pump. The second pump is a 3,000 gpm, 150 psi rated booster pump which will boost the pressure into the Reactor Building. Diverse connection points are provided by tapping into the Division 1 RHR system and the Division 2 RHR system. The Division 1 and 2 FLEX connections are shown in Figure 2.

Details:

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

- Procedure 29.ESP.ExtSBO Strategy is to implement partial load shedding until FLEX Generator(s) can supply power to 480 VAC supply panel to repower DC Battery Charger MCCs.
- The 29.EDM.17, "Suppression Pool Cooling," procedure will cover FLEX equipment hookup for Torus cooling.
- The 29.ESP.ExtSBO, "Extended SBO," procedure will cover AC load shedding, implementation of alternate AC through generators, and provides a cross reference to available instrumentation/power sources and redundant instrumentation/power supplies. A listing of local instruments that are power independent AND methods to monitor key parameters using locally connected meters will also be supplied in this procedure.
- The 29.EDM.18, "Water Management" procedure will cover water sources, discharge location, and fueling of diesel driven equipment.
- The 29.EDM.13, "Fuel Management" " procedure will cover strategies, sources, and equipment necessary to provide diesel fuel and maintain functionality of diesel driven FLEX Phase 2 equipment for an indefinite period of time.
- AOP 20.000.01, "Acts of Nature, Flooding", is being revised to include warnings and interface with National Weather Service (NWS) along with actions to pre-stage equipment and potentially reduce BDB event heat loads by plant operational actions.
- Fermi 2 will incorporate the supplemental guidance provided in the NEI position paper entitled "Shutdown / Refueling Modes" to enhance the shutdown risk process and procedures.

Identify modifications	*List modifications*

The following modifications are necessary for Core Cooling in Phase 2:

- A modification will be required for FLEX equipment to breach the security barrier.
- A modification will be required for FLEX equipment to enter the Reactor Building into

Maintain Core Cooling		
BWR Portable Equipment Phase 2:		
the RHR system.		
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*	
Parameters	**Transmitter PIS #**	**Instrumentation PIS #**
Reactor water level – wide range	B21-N091B/C	B21-R623A/B
Reactor Pressure – wide range	B21-N051A/B	B21-R623A/B
RCIC Suction	E51-R002	E51-R609
RCIC Discharge	E51-R001	E51-R609

Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect*
Structures to provide protection of the FLEX equipment will be constructed to meet the specific requirements identified in NEI 12-06 sections: 5.3.1 Protection of FLEX Equipment –Seismic Hazard ; 6.2.3.1 Protection of FLEX Equipment-Flood Hazard; 7.3.1 Protection of FLEX Equipment-High Wind Hazard; 8.3.1 Protection of FLEX Equipment- snow, ice and extreme cold; 9.3.1 Protection of FLEX Equipment- high temperatures; 11.3 Equipment Storage. Fermi Station procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to Fermi.	
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level	*List how equipment is protected or schedule to protect*
Fermi Station is not susceptible to flooding without warning. The staging areas for the equipment will be above the flood plain or otherwise protected from the maximum probable flood.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*
Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06 Section 7. Fermi Station procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to Fermi.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*
Structures to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06 Section 8. Fermi Station procedures and programs are being developed to address storage structures requirements, haul path requirements, personnel protective equipment storage and use, and FLEX equipment requirements relative to the hazards applicable to Fermi.	
High Temperatures	*List how equipment is protected or schedule to protect*
Storage structures will be ventilated to maintain equipment functionality. Ventilated buildings are expected to stay within the temperature ranges of the equipment stored in those locations. Fermi Station procedures and programs are being developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the hazards applicable to Fermi.	

Deployment Conceptual Modification **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Primary and Backup FLEX equipment will be stored in robust structures near the location of its expected use. Dedicated FLEX trucks, housed with the equipment, will deploy the FLEX hoses to the connection points. Fuel capacity in installed fuel tank of the FLEX pumps will support 7 hours of operation. A fuel truck or trailered tank will be required, along with debris clearing, to refuel the pumps within 7 hours of their operation.	• A modification will be performed to transition FLEX pipe through the security barriers. This transition pipe will have connection points on both sides for the attachment of FLEX hose. • Penetration(s) of the Reactor Building west wall will be required to facilitate tapping into both divisions of the RHR system for the FLEX pumps.	• The Reactor Building connection points will be flood protected, seismically robust, and protected from missiles.

Maintain Core Cooling		
BWR Portable Equipment Phase 3:		
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC) and strategy(ies) utilized to achieve this coping time. Phase 2 activities are credited for indefinite BDBEE coping. Fermi Station has entered into an agreement with industry peers and will be supplied Phase 3 response equipment from one or both of two Regional Response Centers. This equipment will be staged and connected in accordance with specified plant programs and procedures.		
Details:		
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*	
• Procedure 29.EDM.19 "Preparation and Connection of Phase 3 FLEX Equipment" will cover staging & implementation of Phase 3 off-site supplied resources.		
Identify modifications	*List modifications*	
• No modifications to permanent plant equipment are currently planned.		
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.*	
Parameters	**Transmitter PIS #**	**IndicationPIS #**
Reactor water level – wide range	B21-N091B/C	B21-R623A/B
Reactor Pressure – wide range	B21-N051A/B	B21-R623A/B

Deployment Conceptual Modification **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Equipment will be delivered from the RRC to the staging area. From there, the equipment will be transported to the site and hooked-up by both RRC personnel and plant personnel per the playbook. Equipment will then be operated by plant procedures. A fuel truck or trailered tank will be required, along with debris clearing, to refuel the FLEX pumps.	• No modifications to permanent plant equipment are currently planned, equipment will be connected to existing equipment.	• Connection points will be validated to withstand the applicable hazards.

Maintain Containment

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

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

BWR Installed Equipment Phase 1:

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain containment integrity. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time.

All Containment parameters are expected to remain within design values during the Phase 1 coping period (preliminary MAAP run 605).

Details:

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

- The following three procedures may need to be modified to describe what needs to be done when the PSP is exceeded:
  1. EOP 29.100.01, Sheet 2, Rev 12, "Primary Containment Control"
  2. EOP 29.100.01, Sheet 3, Rev 9,"RPV Flooding Emergency Depressurization and Steam Cooling"
  3. EOP 29.100.01 Sheet 6, Rev 15, "Curves, Cautions, and Tables"
- The 20.300.SBO, "Loss of Offsite and Onsite Power," procedure is being modified with a condition to go to the extended SBO procedure (29.ESP.ExtSBO), and a condition to reset ARI to reduce DC loading.
- The 29.ESP.ExtSBO is the procedure which will govern actions for extended SBO and provides a cross reference to available instrumentation/power sources and redundant instrumentation/power supplies. A listing of local instruments that are power independent AND methods to monitor key parameters using locally connected meters will also be supplied in this procedure.

Identify modifications	*List modifications*

- A modifications to restore drywell pressure and torus level instrumentation is planned.

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

Key Containment Parameters	*List instrumentation credited for this coping evaluation.*	
Parameters	**Transmitter PIS #**	**Indication PIS #**
Torus Pressure	T50-N414A/B	T50-R802A/B
Drywell Pressure	T50-N415A/B	T50-R802A/B
Torus Level	T50-N406A/B	T50-R804A/B
Torus Temperature	------	T50-R800B
Drywell Temperature	------	T50-R800B

Maintain Containment

BWR Portable Equipment Phase 2:

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain containment integrity. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time.

The Phase 2 strategy is to control the Containment pressure and temperature by performing a feed-and-bleed of the Torus water. HPCI and/or FLEX pumps will supply cool water to the Torus and HPCI/RCIC will pump out the hot water. The FLEX pumps water supply will be the Circulating Water Pond. The CST, if available, or the suppression pool [credited source] would supply HPCI/RCIC. The water will be rejected to the circulating water reservoir, a controlled location. If this strategy is insufficient, the Torus hardened vent will be initiated as directed in the Emergency Operating Procedures.

Additionally, the operators will implement DC load shedding and DC restoration, as well as AC load shedding and initiation of Phase 2 supplemental AC power. Once supplemental AC power is established, drywell leakage from the Reactor Recirculation Pumps is terminated by closing the associated isolation valves.

Details:

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

The following procedures are being developed or revised:

- The 20.300.SBO, "Loss of Offsite and Onsite Power," procedure is being modified with a condition to go to the extended SBO procedure (29.ESP.ExtSBO), and a condition to reset ARI to reduce DC loading.
- 29.ESP.ExtSBO procedure covers the operation in an extended SBO condition, DC load shedding, AC load shedding and supplemental AC power, closure of DW valves to eliminate Reactor Recirculation seal leakage (if required), operation of Torus Hardened Vent (if required) and provides a cross reference to available instrumentation/power sources and redundant instrumentation/power supplies. A listing of local instruments that are power independent AND methods to monitor key parameters using locally connected meters will also be supplied in this procedure.

Maintain Containment

BWR Portable Equipment Phase 2:

- 29.EDM.17, "Suppression Pool Cooling," procedure covers containment cooling with FLEX equipment.
- Procedure 29.EDM.18, "Water Management" covers water management (location of sources and discharge locations) and
- Procedure 29.EDM.13, "Fuel Management" covers Fuel supplies to Diesels/Generators.
- AOP 20.000.01, "Acts of Nature, Flooding", is being revised to include warnings and interface with NWS along with actions to pre-stage equipment and potentially reduce heat loads by plant actions.
- Fermi 2 will incorporate the supplemental guidance provided in the NEI position paper entitled "Shutdown / Refueling Modes" to enhance the shutdown risk process and procedures.

Identify modifications	*List modifications*

- A modification will be required for FLEX equipment to breach the security barrier.
- A modification will be required to provide Reactor Building entry and supply water into the RHR system.
- A modification will be required to return Torus water via the HPCI test return line bleed flow via the supplemental chiller line and GSW return to the Circ. Water Reservoir.
- A modification will be required to connect either of two 550 kW generators to the AC buses.
- Modifications will be required to restore Drywell pressure and Torus level indication.

Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.*

Parameters	**Transmitter PIS #**	**Indication PIS #**
Torus Pressure	T50-N414A/B	T50-R802A/B
Drywell Pressure	T50-N415A/B	T50-R802A/B
Torus Level	T50-N406A/B	T50-R804A/B
Torus Temperature	------	T50-R800B
Drywell Temperature	------	T50-R800B
HPCI Suction/Discharge Pressure Gauge	E41-N019	E41-R609

Storage / Protection of Equipment :

Describe storage / protection plan or schedule to determine storage requirements

Seismic	*List how equipment is protected or schedule to protect*

Equipment will be stored in robust structures near the location of its expected use (See Figure 1). Structures to provide protection of the FLEX equipment will be constructed to meet the specific requirements identified in NEI 12-06 sections:
5.3.1 Protection of FLEX Equipment – Seismic Hazard ; 6.2.3.1 Protection of FLEX Equipment-Flood Hazard; 7.3.1 Protection of FLEX Equipment-High Wind Hazard; 8.3.1 Protection of FLEX Equipment- snow, ice and extreme cold; 9.3.1 Protection of FLEX Equipment- high temperatures; 11.3 Equipment Storage.

Maintain Containment	
BWR Portable Equipment Phase 2:	
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect*
Fermi is not susceptible to flooding without warning. The staging areas for the equipment will be above the flood plain or otherwise protected from the maximum probable flood.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*
Structures to provide protection of the FLEX equipment will be constructed to meet the specific requirements identified in NEI 12-06 sections: 5.3.1 Protection of FLEX Equipment –Seismic Hazard ; 6.2.3.1 Protection of FLEX Equipment-Flood Hazard; 7.3.1 Protection of FLEX Equipment-High Wind Hazard; 8.3.1 Protection of FLEX Equipment- snow, ice and extreme cold; 9.3.1 Protection of FLEX Equipment- high temperatures; 11.3 Equipment Storage.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*
The equipment housed inside the structures will be protected from snow, ice and extreme cold. Personnel protective equipment and debris removal equipment will be stored on the FLEX vehicles.	
High Temperatures	*List how equipment is protected or schedule to protect*
The equipment housed inside the structures will be provided with adequate ventilation.	

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Primary and Backup FLEX equipment will be stored in robust structures near the location of its expected use. Dedicated FLEX trucks, housed with the equipment, will deploy the hose to the connection points. Fuel capacity in installed fuel tank of the FLEX pumps will support 7 hours of operation. A fuel truck or trailered tank will be required, along with debris clearing, to refuel the pumps within 7 hours of their operation. Water would be removed from the Torus with HPCI or RCIC to an on-site containment area. Cooler water would be added from FLEX water supply through FLEX equipment to the Torus, providing feed-and-bleed cooling.	• A modification will be performed to transition FLEX pipe through the security barriers. This transition pipe will have connection points on both sides for the attachment of FLEX hose. • Two penetrations of the Reactor Building west wall will be required to facilitate tapping into both divisions of the RHR system for the FLEX pumps. • A modification is required to facilitate water transfer from the HPCI test return line to the Circulating water reservoir. • Modifications to receive power from the 550 kW generators.	• The Reactor Building connection points will be flood protected, seismically robust, and protected from missiles.

Maintain Containment
BWR Portable Equipment Phase 3:
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain containment integrity. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. Phase 2 activities are credited for indefinite BDBEE coping. Fermi Station has entered into an agreement with industry peers and will be supplied Phase 3 response equipment from one or both of two Regional Response Centers. This equipment will be staged and connected in accordance with specified plant programs and procedures.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
• Procedure 29.EDM.19 "Preparation and Connection of Phase 3 FLEX Equipment" will cover staging & implementation of Phase 3 off-site supplied resources.	
Identify modifications	*List modifications*
No modifications to permanent plant equipment are currently planned.	

Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.*	
Parameters	**Transmitter PIS #**	**IndicationPIS #**
Torus Pressure	T50-N414A/B	T50-R802A/B
Drywell Pressure	T50-N415A/B	T50-R802A/B
Torus Level	T50-N406A/B	T50-R804A/B
Torus Temperature	------	T50-R800B
Drywell Temperature	------	T50-R800B

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Equipment will be delivered from the RRC to the staging area. From there, the equipment will be transported to the site and hooked-up by both RRC personnel and plant personnel per the playbook.	• No modifications to permanent plant equipment are currently planned, equipment will be connected to existing equipment.	• Connection points will be validated to withstand the applicable hazards.

Equipment will then be operated by plant procedures. A fuel truck or trailered tank will be required, along with debris clearing, to refuel the FLEX pumps.		

Maintain Spent Fuel Pool Cooling	
Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **Makeup with Portable Injection Source**	
BWR Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time. The required Phase 1 action is to monitor Spent Fuel Pool (SFP) level. This is based on initial SFP level, bounding heat load of a full core off-load, and predicted time-to boil.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
• The EOPs are being revised to include SFP monitoring & control. • EOP 29.100.01, Rev 9, Sheet 5 "Secondary Containment and Rad Release".	
Identify modifications	*List modifications*
SFP level instruments to be installed per Order EA-12-051.	
Key SFP Parameters	*List instrumentation credited or recovered for this coping evaluation.*
• SFP instruments to be installed per Order EA-12-051.	

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

Maintain Spent Fuel Pool Cooling

BWR Portable Equipment Phase 2:

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time.

The normal SFP water level at the event initiation is approximately 22 feet over the top of the stored spent fuel (Tech Spec 3.7.7). Using the design basis maximum heat load, the SFP water inventory will begin to boil off at 4.2 hours (Reference 1). This corresponds to a 90.77 gpm boil off water loss rate, which is equal to approximately 6 inches per hour of level loss.

Makeup for the Spent Fuel Pool will be provided by the FLEX pumps that are hooked up to the RHR system for the Core Cooling strategy. Sufficient capacity exists with the FLEX pumps to provide the required flow rates for concurrent Containment Cooling, Core Cooling, and Spent Fuel Pool makeup. Spent Fuel Pool monitoring described in Phase 1 will continue to be used to monitor water level to determine whether water needs to be added via FLEX equipment. Control of makeup flow to the Spent Fuel Pool is provided by a manual-operated valve located near the SFP level monitor available on the 2nd floor of the Reactor Building.

Venting the Reactor Building (RB), RB-5 area [as shown in NEI 12-06 Table C-3] will be performed if the spent fuel pool level or temperature cannot be maintained using Phase 2 equipment and credited flow paths. Doors will be opened establishing a flow path from the RB-5 area, through the auxiliary building stairwell and out to the auxiliary building roof areas.

Additional methods to provide makeup to the Spent Fuel Pool are detailed in procedure 29.EDM.03, Revision 3, as previously developed for 10CFR50.54(hh)(2) (NRC SER, "Fermi 2 Conforming License Amendment to Incorporate the Mitigation Strategies Required by Section B.5.b of Commission Order EA-02-026 and the Radiological Protection Mitigation Strategies Required by Commission Order EA-06-137 (TAC No. MD4S32)", dated August 23, 2007).

1. Calculation HI-992207, "Bulk SFP Thermal-Hydraulic Analysis for Reracking of Fermi Unit 2," Rev 5

Schedule:

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

- The 29.ESP.ExtSBO procedure will dictate when/how to add water for SPF level makeup per the strategy described above.
- Procedure 29.EDM.03 "SFP Makeup/Spray – External Strategy"

Identify modifications	*List modifications*

- A modification will be required for FLEX equipment to breach the security barrier.
- A modification will be required to breach the Reactor Building and tie into the RHR system.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
• SFP instruments to be installed per Order EA-12-051.	
Key SFP Parameters	*List instrumentation credited or recovered for this coping evaluation.*
• SFP instruments to be installed per Order EA-12-051.	

Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect*
Equipment will be located in protected locations away from any non-seismic structures. Additionally, Structures to provide protection of the FLEX equipment will be constructed to meet the specific requirements identified in NEI 12-06 sections: 5.3.1 Protection of FLEX Equipment –Seismic Hazard ; 6.2.3.1 Protection of FLEX Equipment-Flood Hazard; 7.3.1 Protection of FLEX Equipment-High Wind Hazard; 8.3.1 Protection of FLEX Equipment- snow, ice and extreme cold; 9.3.1 Protection of FLEX Equipment- high temperatures; 11.3 Equipment Storage.	
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect*
Fermi is not susceptible to flooding without warning. The staging areas for the equipment will be above the flood plain or otherwise protected from the maximum probable flood.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*
Equipment will be stored in robust structures near the location of its expected use.(Figure 1). Structures to provide protection of the FLEX equipment will be constructed to meet the specific requirements identified in NEI 12-06 sections: 5.3.1 Protection of FLEX Equipment –Seismic Hazard ; 6.2.3.1 Protection of FLEX Equipment-Flood Hazard; 7.3.1 Protection of FLEX Equipment-High Wind Hazard; 8.3.1 Protection of FLEX Equipment- snow, ice and extreme cold; 9.3.1 Protection of FLEX Equipment- high temperatures; 11.3 Equipment Storage.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*
The equipment housed inside the structures will be protected from snow, ice and extreme cold. Personnel protective equipment and debris removal equipment will be stored on the FLEX vehicles.	
High Temperatures	*List how equipment is protected or schedule to protect*
The equipment housed inside the structures will be provided with adequate ventilation.	

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Primary and Backup FLEX equipment will be stored in robust structures near the location of its expected use.	• A modification will be performed to transition FLEX pipe through the security barriers. This	• The Reactor Building connection points will be flood protected, seismically robust, and

Dedicated FLEX trucks, housed with the equipment, will deploy the hose to the connection points. Fuel capacity in installed fuel tank of the FLEX pumps will support 7 hours of operation. A fuel truck or trailered tank will be required, along with debris clearing, to refuel the pumps within 7 hours of their operation. Water would be added to the SFP using the RHR piping and installed Fuel Pool flow path.	transition pipe will have connection points on both sides for the attachment of FLEX hose. • Two penetrations of the Reactor Building west wall will be required to facilitate tapping into both divisions of the RHR system for the FLEX pumps.	protected from missiles.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time. Spent Fuel Pool inventory and will be maintained by Phase 2 FLEX pumps indefinitely. Fermi Station has entered into an agreement with industry peers and will be supplied Phase 3 response equipment from one or both of two Regional Response Centers. This equipment will be staged and connected in accordance with specified plant programs and procedures.	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
• Procedure 29.EDM.19 "Preparation and Connection of Phase 3 FLEX Equipment" will cover staging & implementation of Phase 3 off-site supplied resources.	
Identify modifications	*List modifications*
No modifications to permanent plant equipment are currently planned.	
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.*
SFP level instruments to be installed per Order EA-12-051	

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Equipment will be delivered from the RRC to the staging area. From there, the equipment will be transported to the site and hooked-up by both RRC personnel and plant personnel per the playbook. Equipment will then be operated by plant procedures. A fuel truck or trailered tank will be required, along with debris clearing, to refuel the FLEX pumps.	• No modifications to permanent plant equipment are currently planned; equipment will be connected to existing equipment.	• Connection points will be validated to withstand the applicable hazards.

Safety Functions Support
Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications.
BWR Installed Equipment Phase 1
Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Installed coping equipment is the Division 1 and Division 2 DC distribution system. The DC distribution system supplies the power to the equipment necessary to achieve the FLEX strategy outlined in the above sections. Equipment utilized for this coping includes: HPCI, RCIC, SRVs, inverters, and some Control Room instrumentation. AC power sources are assumed unavailable. Access for Phase 1 involves the Division 1 and Division 2 ESF Switchgear Room, Relay Room, DC battery and Motor Control Center (MCC) area and Control Room only. These areas are located in non-steam environments, and are not expected to have any appreciable increase in temperature, and have been previously evaluated per the previous SBO rulemaking (UFSAR 8.4.2.3.4, UFSAR 6.4.1.2).

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*
• The 29.ESP.ExtSBO covers the plant strategy for coping during an extended SBO and provides a cross reference to available instrumentation/power sources and redundant instrumentation/power supplies. A listing of local instruments that are power independent AND methods to monitor key parameters using locally connected meters will also be supplied in this procedure.	
Identify modifications	*List modifications*
No modifications required.	
Key Parameter	*List instrumentation credited for this coping evaluation phase.*

Parameters	**Transmitter PIS #**	**Indication PIS #**
DC voltage		R3200-S051 R3200-S052 R3200-S053

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

		R3200-S054 R3200-S055 R3200-S056

Safety Functions Support

BWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Prompt restoration of DC battery chargers from FLEX Phase 2 power supplies will provide sufficient capacity, in conjunction with partial load shedding, to power all DC loads required for FLEX.

Supplemental 550 kW FLEX generators will be connected to power all AC loads required for FLEX. The plant 480 V system and the tie-in locations for the FLEX generators are shown on Figure 3. The 550 kW generators have been sized to power all necessary phase 2 FLEX loads.

Execution of the Phase 2 FLEX strategy involves short term access to the Reactor Building 1st floor, 2nd floor, and the Auxiliary Building Basement. Access to these areas is only for a short period of time and is conducted prior to significant Torus heatup (less than five hours for the deployment of the Phase 2 FLEX strategy).

Access for Phase 2 involves the Division 1 and Division 2 ESF Switchgear Room, Relay Room, DC battery and MCC area and Control Room. These areas are located in non-steam environments, and are not expected to have any appreciable increase in temperature, and have been previously evaluated per the previous SBO rulemaking (UFSAR 8.4.2.3.4, UFSAR 6.4.1.2). Long term ventilation for the DC battery areas will be established through portable fans to mitigate hydrogen buildup.

Details:

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

- The 29.ESP.ExtSBO procedure covers AC and DC load shedding and provides a cross reference to available instrumentation/power sources and redundant instrumentation/power supplies. A listing of local instruments that are power independent AND methods to monitor key parameters using locally connected meters will also be supplied in this procedure.

Identify modifications	*List modifications*

Modification to install Phase 2 FLEX electrical connection points to supply the required Division 1 and Division 2 480 VAC buses.

Safety Functions Support		
BWR Portable Equipment Phase 2		
Key Parameter	*List instrumentation credited for this coping evaluation phase.*	
Parameters	**Transmitter PIS #**	**Indication PIS #**
DC voltage		R3200-S051 R3200-S052 R3200-S053 R3200-S054 R3200-S055 R3200-S056
AC voltage		R14-R852 R14-R900 R14-R809 R14-R849 R14-R897
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**		
Seismic	*List how equipment is protected or schedule to protect*	
The AC generators will be stored in accordance with the NEI 12-06 Section 5 guidelines to be protected from all applicable hazards.		
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect*	
The AC generators will be stored in accordance with the NEI 12-06 Section 6 guidelines to be protected from all applicable hazards.		
Severe Storms with High Winds	*List how equipment is protected or schedule to protect*	
The AC generators will be stored in accordance with the NEI 12-06 Section 7 guidelines to be protected from all applicable hazards.		
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect*	
The AC generators will be stored in accordance with the NEI 12-06 Section 8 guidelines to be protected from all applicable hazards. Personnel protective equipment and debris removal equipment will be stored on the FLEX vehicles.		
High Temperatures	*List how equipment is protected or schedule to protect*	
The AC generators will be stored in accordance with the NEI 12-06 Section 9 guidelines to be protected from all applicable hazards.		

Safety Functions Support		
BWR Portable Equipment Phase 2		
Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The AC generators will have the ability to connect to a local disconnect switch which is in turn tapped into the 480 v buses. DC battery chargers will be powered from FLEX AC panels, which, in conjunction with partial load shedding, will maintain battery voltage sufficient to support credited FLEX equipment functions. A fuel truck or trailered tank will be required, along with debris clearing, to provide refueling to the generators.	• Implementation electrical connections which will allow the AC generators to supply the 480 VAC buses.	• The connection points are protected from all applicable hazards.

Safety Functions Support		
BWR Portable Equipment Phase 3		
Provide a general description of the coping strategies using Phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Phase 2 activities are credited for indefinite BDBEE coping. Fermi Station has entered into an agreement with industry peers and will be supplied Phase 3 response equipment from one or both of two Regional Response Centers. This equipment will be staged and connected in accordance with specified plant programs and procedures.		
Details:		
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation*	
• Procedure 29.EDM.19 "Preparation and Connection of Phase 3 FLEX Equipment" will cover staging & implementation of Phase 3 off-site supplied resources		
Identify modifications	*List modifications*	
• No modifications to permanent plant equipment are currently planned.		
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.*	
Parameters	**Transmitter PIS #**	**Indication PIS #**
DC voltage		R3200-S051 R3200-S052 R3200-S053 R3200-S054 R3200-S055 R3200-S056
AC voltage		R14-R852 R14-R900 R14-R809 R14-R849 R14-R897

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Equipment will be delivered from the RRC to the staging area. From there, the equipment will be transported to the site and hooked-up by both RRC personnel and plant personnel per the playbook. Equipment will then be operated by plant procedures. A fuel truck or trailered tank will be required, along with debris clearing, to refuel FLEX equipment as required.	• No modifications to permanent plant equipment are currently planned.	• Connection points will be validated to withstand the applicable hazards.

BWR Portable Equipment Phase 2							
Use and (potential / FLEXibility) diverse uses							*Maintenance*
List portable equipment	Performance Criteria	Core	Containment	SFP	Instrumentation	Accessibility	Maintenance / PM requirements
Two (2) Red Devil Blowers	N/A					X	Will follow NEI 12-06 Section 11.3.2 requirements
Two (2) Generators for AC loads	550 KW, diesel generators	X	X	X		X	Will follow NEI 12-06 Section 11.3.2 requirements
Two (2) Lift pumps for drawing water from CW Pond	3000 GPM, 150 psi	X	X	X			Will follow NEI 12-06 Section 11.3.2 requirements
Two (2) booster pumps for boosting pressure into the Reactor Building	3000 GPM, 150 psi	X	X	X			Will follow NEI 12-06 Section 11.3.2 requirements
Four (4) Super Aquaduct Flexible Pipeline	10" diameter x 660 ft	X	X	X			Will follow NEI 12-06 Section 11.3.2 requirements
Duplex Strainer	10-inch	X	X	X			Will follow NEI 12-06 Section 11.3.2 requirements

BWR Equipment Phase 3							
Use and (potential / FLEXibility) diverse uses							*Maintenance*
List portable equipment	Criteria	Core	Containment	SFP	Instrumentation	Accessibility	Maintenance / PM requirements
Diesel Powered Air compressor	[prelim] 150 psig 150 CFM	X	X				Will follow NEI 12-06 Section 11.3.2 requirements

	> 24 Hour Response	
	Item	**Notes**
	Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	
	Commodities • Food • Potable water	Provide at least one week of food and water.
	Fuel Requirements • Diesel Fuel	
	Portable Lighting	Diesel driven lighting system.
	Communications • Satellite phones • Radios	

Attachment 1A
Sequence of Events Timeline-Non Flood

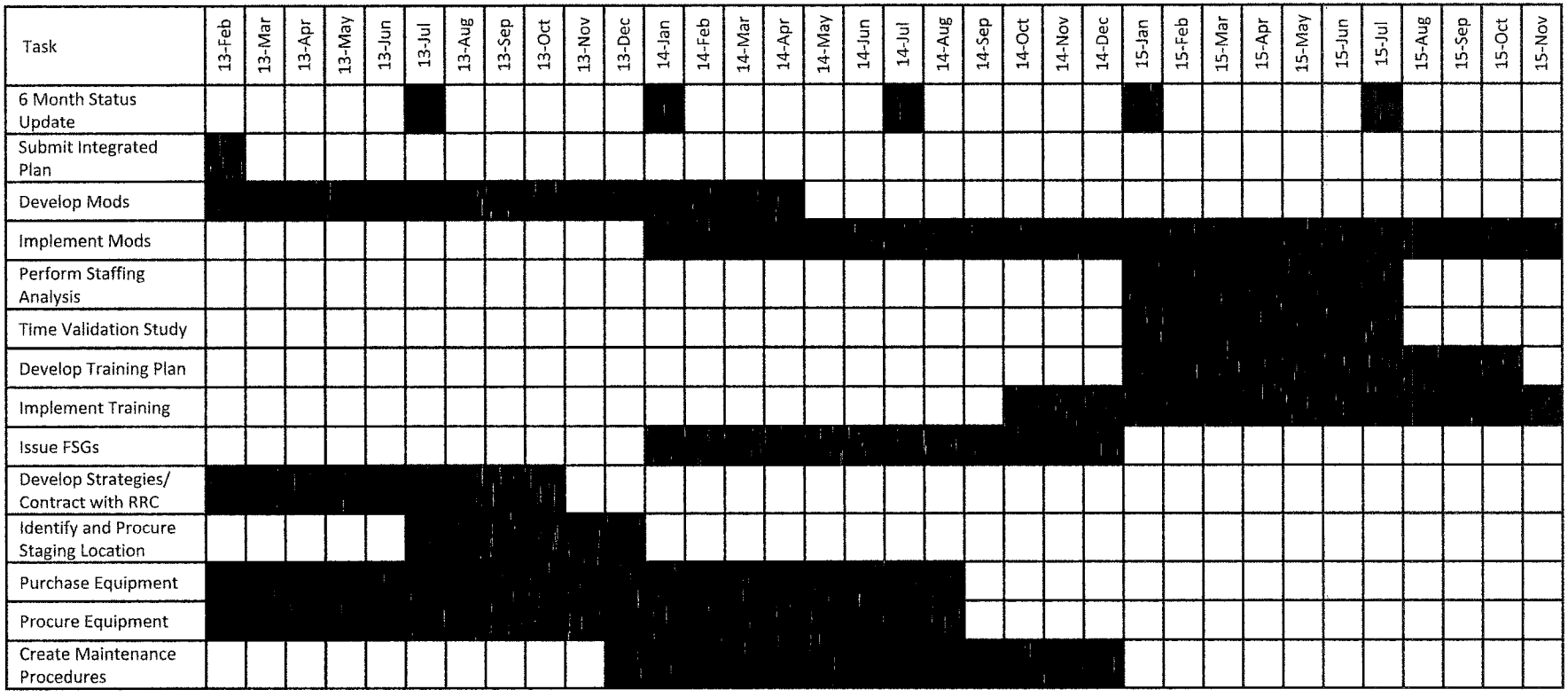
Time	Action
0 hours – 5 min	EVENT occurs and begins SBO scenario. • In the control room: Use EOPs and other procedures to restore and maintain level. Verify rods in (P603), then reset Alternate Rod Insertion (ARI). • All operators head to control room. • RCIC will continue to feed from the CST, if available. • HPCI and RCIC start and inject on RPV level 2.
10 min	Send operators to EDGs and Combustion Turbine Generators.
45 min – 4 hours	The shift manager declares an extended loss of AC power. EXIT SBO and ENTER ELAP/LUHS procedures. This ensures timely entry into ELAP/LUHS procedures. • Begin DC load shedding [45 – 75 min] o Initiate supplemental DC with battery chargers (the two 10 kW generators) [75 – 120 min]. • Put HPCI in Torus-to-Torus (override E4150F011) [start at 60 min] • SBO/ELAP items are ongoing [45 min] • Dispatch operators to Circulating Water Pond for FLEX pumps [60 min – 240 min] • HPCI pressure control [60 min – FLEX is ready] • AC Stripping [1-3 hours] • AC generators aligned to support safety functions
5 hours	Operators finish preparing FLEX equipment. FLEX pumps are ready to operate to support the three safety functions.
5 hours	Begin pumping water out of the Torus.
24 hours	First Phase 3 generator arrives at staging area
30 hours +	FLEX Phase 3 generator(s) are hooked up to supply power to Division 1 4160 V busses per 29.EDM.19.
NOTE	Specific references to items in this table are covered by the Sequence of Events references located earlier in this plan.

Attachment 1A
Sequence of Events Timeline-Flood

Time	Action
-36 hours	If the National Weather Service (NWS) projects a potential flood then a flood watch would be issued. Flood watch actions include setting staffing per 29.ESP.ExtSBO and staging equipment for flood response per AOP 20.000.01, Acts of Nature. This includes manning remote stations and connecting FLEX Phase 2 equipment except for supplemental AC/DC connections.
-12 hours	If the NWS projects an actual flood, a flood warning would be issued. Flood warning actions include confirming flood equipment in place and manning of the remote stations per 29.ESP.ExtSBO and AOP 20.000.01. AOP 20.000.01, Acts of Nature-Flooding would direct a reactor shutdown and cooldown to place the plant in cold shutdown prior to the possible loss of the station's normal heat sink. Reactor Cold shutdown is expected by -2 hours based on plant shutdown procedures and prior shutdown experience. Reactor Recirculation Piping would be isolated at this time prior to loss of AC to prevent seal leakage issues.
0 hours – 5 min	EVENT occurs and begins SBO event. • In the control room: Use EOPs and other procedures to restore and maintain RPV level. No steam draw occurs as RPV temperature will start at 110 F rising to 187 psig (381 F) at about 4 hours after the SBO. Based on this the initial actions will be to monitor only • All operators proceed to control room.
10 min	Send operators to EDGs and Combustion Turbine Generators.
50 min – 3 hours	The shift manager declares an extended loss of AC power. EXIT SBO and ENTER ELAP/LUHS procedures • Begin DC load shedding [50 – 75 min] o Initiate supplemental DC with battery chargers (the two 10 kW generators) [75 – 120 min]. • SBO/ELAP items are ongoing [60 min] • AC Stripping [1-2 hours]
4 hours	Based on Decay heat in the RPV at 12 hours after shutdown, the RPV temperature will rise to 381 F about 4 hours after loss of AC. • RCIC would be started and injection started at this point
5 hours	Energize the Supplemental AC and connect to critical loads (specifically the Battery Chargers, Lighting and communications)
5-17 hours	Evaluate FLEX hose routing following flooding and determine if sections need to be redeployed using N+1 hose prior to the 21 hour point
17-21 hours	Redeploy FLEX hoses as required after the flood recedes.
21 hours	Begin pumping water out of the Torus at about 3000 gpm with HPCI (batching with FLEX pumps supplying at 2000 gpm) at Torus

	Temperature of about 205 F. • HPCI can pump out until approximately 72 hours • Then use RCIC • Then use Torus Water Management System (TWMS) pumps from Torus to Hotwell
24 hours	First Phase 3 generator arrives at staging area
30 hours +	FLEX Phase 3 generator(s) are hooked up to supply power to Division 1 4160 V busses per 29.EDM.19.

Attachment 2
Milestone Schedule



Attachment 3, Conceptual Sketches

Figure 1 – Overview of Phase 2 Equipment Storage and Water Supply Route

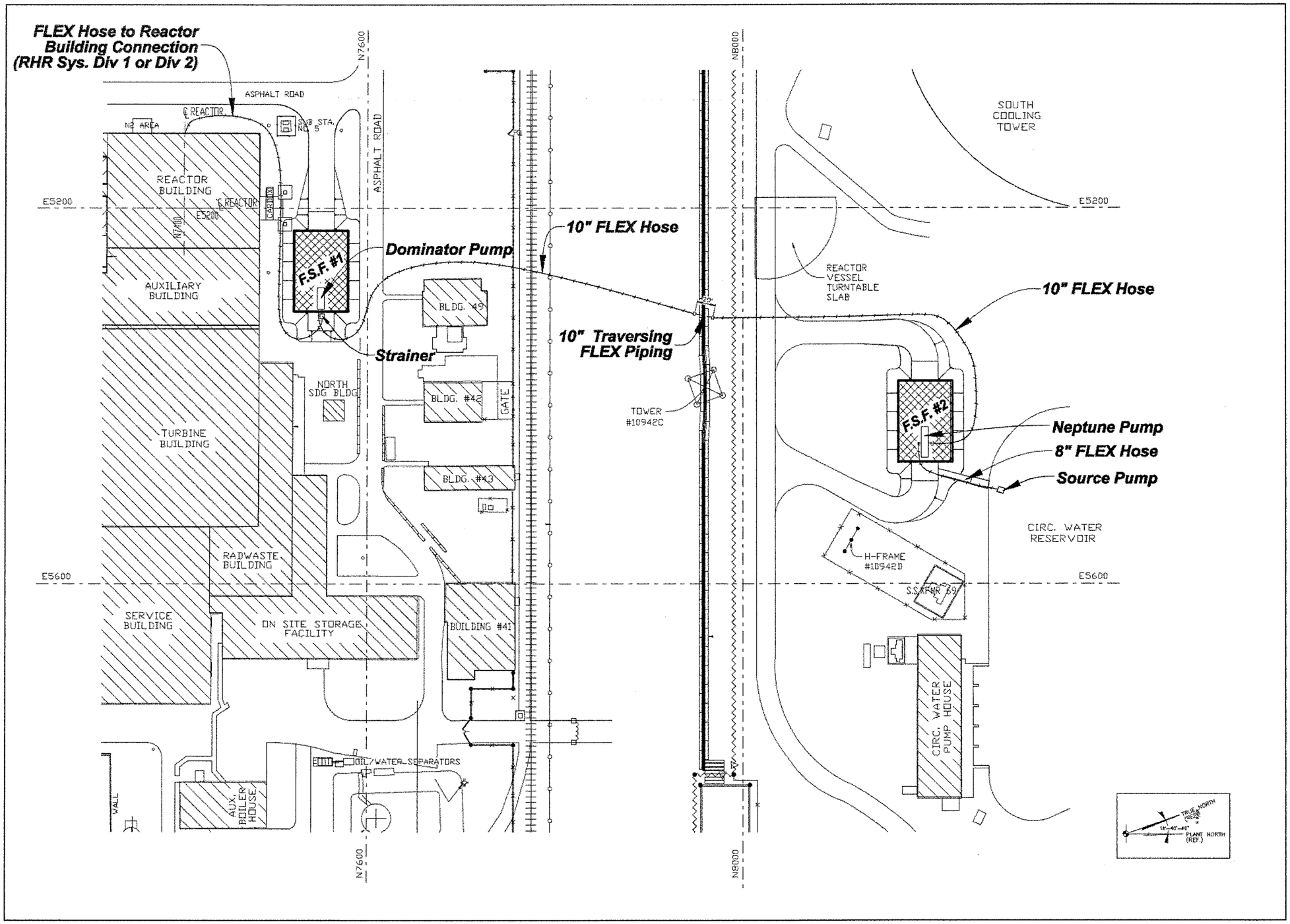


Figure 2 – FLEX Mechanical Conceptual Drawing

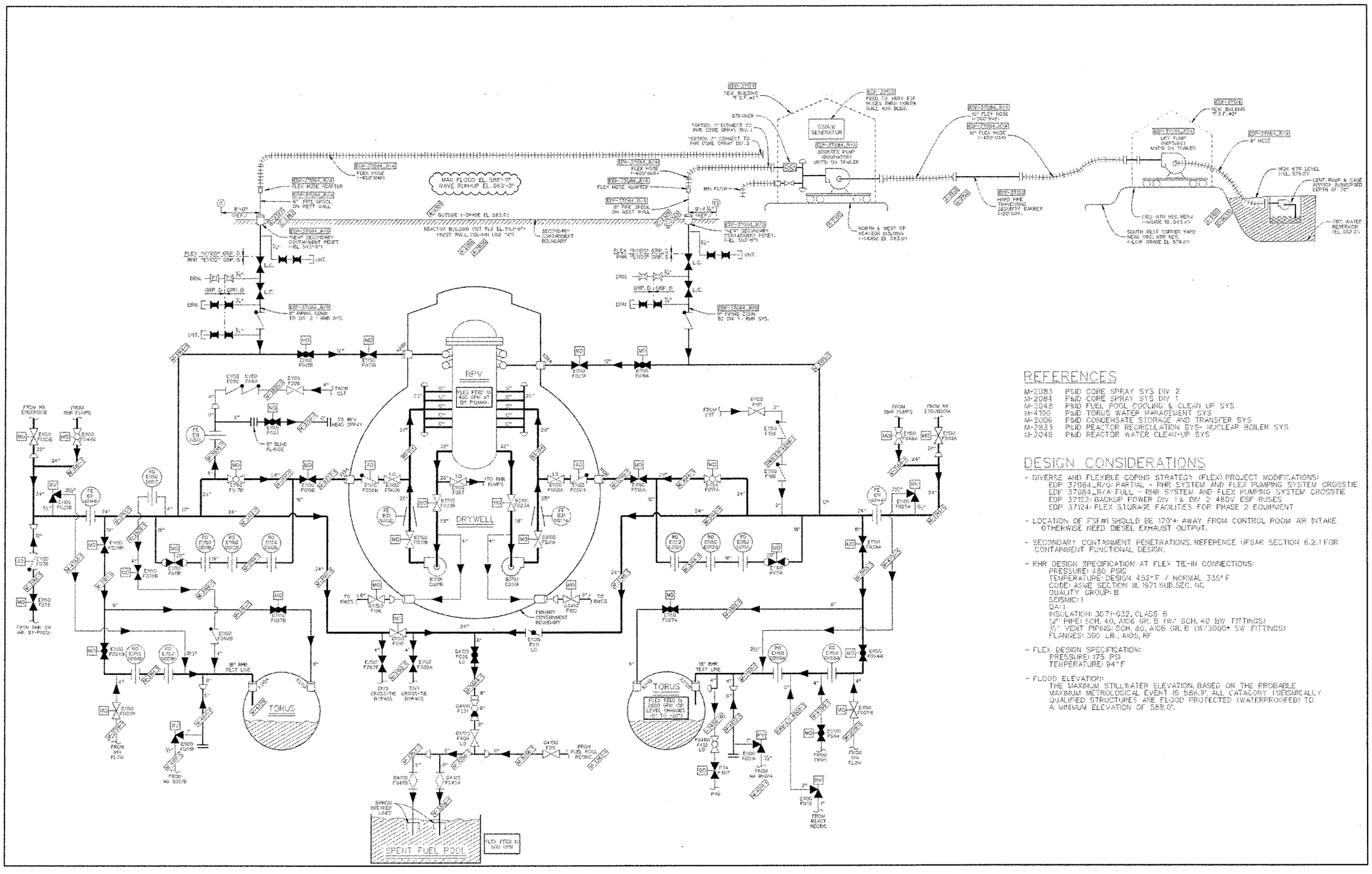
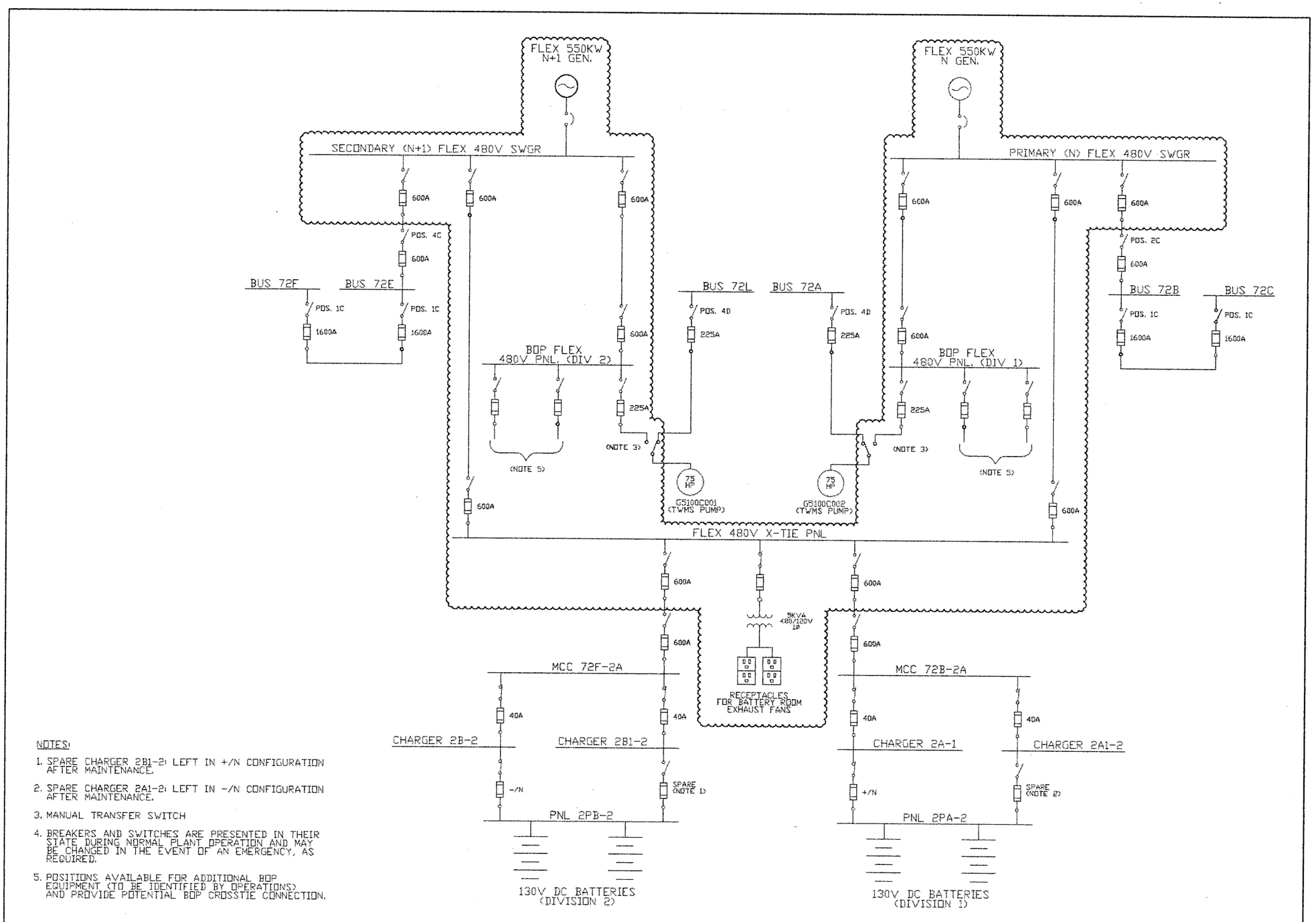


Figure 3 –FLEX Phase 2 Electrical One Line Diagram



NOTES:

1. SPARE CHARGER 2B1-2: LEFT IN +/N CONFIGURATION AFTER MAINTENANCE.
2. SPARE CHARGER 2A1-2: LEFT IN -/N CONFIGURATION AFTER MAINTENANCE.
3. MANUAL TRANSFER SWITCH
4. BREAKERS AND SWITCHES ARE PRESENTED IN THEIR STATE DURING NORMAL PLANT OPERATION AND MAY BE CHANGED IN THE EVENT OF AN EMERGENCY, AS REQUIRED.
5. POSITIONS AVAILABLE FOR ADDITIONAL BOP EQUIPMENT (TO BE IDENTIFIED BY OPERATIONS) AND PROVIDE POTENTIAL BOP CROSSTIE CONNECTION.