

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

August 23, 2013

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EA-12-049

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

Serial No.: 12-162D
NL&OS/MAE: R3
Docket Nos.: 50-338/339
License Nos.: NPF-4/7

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
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, Order Modifying 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. Virginia Electric and Power Company's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated October 25, 2012 (Serial No. 12-162A)
5. Virginia Electric and Power Company's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013 (Serial No. 12-162B)
6. Virginia Electric and Power Company's 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 April 30, 2013 (Serial No. 12-162C)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to Virginia Electric and Power Company (Dominion). Reference 1 was immediately effective and directs Dominion 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.

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Attachment

**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**

**North Anna Power Station Units 1 and 2
Virginia Electric and Power Company (Dominion)**

**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

Dominion developed an Overall Integrated Plan (OIP) (Reference 1) documenting the diverse and flexible strategies (FLEX) for North Anna Power Station in response to NRC Order Number EA-12-049 (Reference 2). This attachment provides an update of milestone accomplishments and open items since submittal of the OIP including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

The following milestone has been completed since the development of the Overall Integrated Plan, and is current as of July 31, 2013.

- Submit Integrated Plan

3 Milestone Schedule Status

The following table provides an update to Attachment 2A of the Overall Integrated Plan. The table 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.

The revised milestone target completion dates for 'Develop Strategies' and 'Unit 1 Outage Implementation' do not impact the Order implementation date.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit Integrated Plan	Feb 2013	Complete	
Develop Strategies	July 2013	Started	October 2013
Develop Modifications	Feb 2014	Started	
Implement Modifications	Sept 2014	Started	
Develop Training Plan	Apr 2014	Started	
Implement Training	Sept 2014	Not Started	
Issue FSGs and Associated Procedure Revisions	Sept 2014	Not Started	
Develop Strategies/ Contract with Regional Response Center (RRC)	Apr 2014	Started	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Purchase Equipment	Feb 2014	Started	
Procure Equipment*	Aug 2014	Not Started	
Validation Walk-throughs or Demonstrations of FLEX Strategies and Procedures*	Apr 2014	Not Started	
Create Maintenance Procedures	Aug 2014	Not Started	
Unit 1 Outage Implementation	Mar 2015	Started	April 2015
Unit 2 Outage Implementation	Sept 2014	In Progress	

* Refer to Section 8 for an explanation of Milestone changes.

4 Changes to Compliance Method

By letter dated February 28, 2013, Dominion provided an Overall Integrated Plan (OIP) to address Beyond-Design-Basis (BDB) events at North Anna Power Station (North Anna) Units 1 and 2 (Reference 1) as required by Order Number EA-12-049, dated March 12, 2012 (Reference 2). The following are changes to the compliance method information provided in the North Anna OIP; however, the changes continue to meet NEI 12-06 (Reference 3):

- a) Details of the connection strategy for RCS injection, as described in Section C.3 – PWR Portable Equipment Phase 3, have changed for North Anna Unit 2 only. The installed tie-in location has been moved from a position downstream of motor-operated valve (MOV) 2-SI-MOV-2890A [Safety Injection (SI) Train A] to a position downstream of 2-SI-MOV-2890B (SI Train B). Figure 4 of the OIP still reflects the connection strategy for Unit 1, only the associated valve numbers that reflect the opposite SI train are different for Unit 2. Therefore, since the change does not impact the connection strategy, OIP Figure 4 is not being revised.
- b) Changes to the timing of the RCS injection strategy have been made. The strategy for RCS injection for inventory and reactivity control has been moved from a Phase 3 activity to a Phase 2 activity. The details and descriptions provided in Section C.3 of the OIP for RCS injection for the Phase 3 activity continue to be the same for the Phase 2 strategy for RCS injection, including the time at which natural circulation capability is lost, i.e., approximately 33 hours based on WCAP-17601 (Reference 5) and ETE-NAF-2012-0150 (Reference 7). For conservatism and margin to account for uncertainty within the calculations and unanticipated deployment issues, a time of 16 hours has been chosen, which provides significant margin (by a factor of 2) prior to loss of natural circulation and the start of reflux boiling.

- c) Details of the strategy for the portable diesel generators (DGs) used to re-power the 120VAC vital bus circuits, as described in Section F1.2 – PWR Portable Equipment Phase 2, have changed for North Anna Units 1 and 2. A single 120/240VAC DG per unit will be sized to accommodate the necessary electrical loads for that unit and will power both BDB distribution panels for that unit. Thus, the deployment of two 120/240VAC DGs per unit as shown in Figure 7 of the previously submitted OIP is no longer being pursued, and a revised Figure 7 is attached. Figure 8 is revised to show the location of the single 120/240VAC DG for each unit and the location of the associated unit's connection receptacles and is also attached. Figure 10 was a typical schematic of the connections from one of two 120/240VAC DGs. A revised Figure 10 showing the current connections for the 120/240VAC DG (Unit 1 only) is attached. A spare 120/240VAC DG will be purchased; however, as stated in the OIP, the 480VAC DG is considered the alternate re-powering source for instrumentation.
- d) The quantities of BDB equipment stated in OIP Table 1, PWR Portable Equipment Phase 2, and OIP Table 2, PWR Portable Equipment Phase 3, have changed. Per Footnote 1 to Table 1, the quantities were based on the assumption that two storage buildings would be available to store BDB equipment pending completion of the study to determine the details of the BDB Storage Building(s). Open Item No. 6 has been completed, and the decision to have one storage building is documented in Section 6 of this update. A revised Table 1 is attached.

As discussed in the previous item b), North Anna will purchase and store BDB RCS Injection Pumps for use in the Phase 2 RCS Inventory strategy. These pumps are being added to the revised Table 1 for Phase 2 equipment.

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

Dominion expects to comply with the Order implementation date and no required relief/relaxation has been identified at this time.

6 Open Items from Overall Integrated Plan

The following table provides a summary of the open items documented in Attachment 2B of the OIP and the status of each item.

Overall Integrated Plan Open Item		
OI #	Description	Status
1	Verify response times listed in timeline and perform staffing assessment.	Not started. Scheduled completion date: April 2014
2	Preliminary analyses have been performed to determine the time to steam generator overfill without operator action to reduce AFW flow, time to steam generator dryout without AFW flow, and time to depletion of the useable volume of the ECST. The final durations will be provided when the analyses are completed.	Complete. (Reference 4)

Overall Integrated Plan Open Item		
OI #	Description	Status
3	Preliminary analyses have been performed to determine the Class 1E battery life based on implementation of load stripping actions. The final battery life duration will be provided when the analyses are completed.	Complete. (Reference 4)
4	The Phase 3 coping strategy to maintain containment integrity is under development. Methods to monitor and evaluate containment conditions and depressurize/cool containment, if necessary, will be provided in a future update.	Started. Scheduled completion date is revised from December 2013 to October 2013 **
5	Analyses will be performed to develop fluid components performance requirements and confirm fluid hydraulic-related strategy objectives can be met.	Started. Scheduled completion date: September 2013
6	A study is in progress to determine the design features, site location(s), and number of equipment storage facilities. The final design for BDB equipment storage will be based on the guidance contained in NEI 12-06, Section 11.3, Equipment Storage. A supplement to this submittal will be provided with the results of the equipment storage study.	Complete. A single 10,000 sq. ft. Type 1 building will be constructed at North Anna for storage of BDB equipment. The building will be designed to meet the plant's design basis for the Safe Shutdown Earthquake, high wind hazards, snow, ice and cold conditions, and will be located above the flood elevation from the most recent site flooding analysis. The BDB Storage Building will be sited in the Owner Controlled Area in the parking lot west of Warehouse #5. This update provides the supplemental information referred to in this open item.
7	FLEX Support Guidelines (FSGs) will be developed in accordance with PWROG guidance. Existing procedures will be revised as necessary to implement FSGs.	Started. Scheduled completion date: September 2014.

Overall Integrated Plan Open Item		
OI #	Description	Status
8	EPRI guidance documents will be used to develop periodic testing and preventative maintenance procedures for BDB equipment. Procedures will be developed to manage unavailability of equipment such that risk to mitigating strategy capability is minimized.	Not started. Scheduled completion date: September 2014
9	An overall program document will be developed to maintain the FLEX strategies and their bases and provide configuration control and change management for the FLEX Program.	Started. Scheduled completion date: September 2014
10	The Dominion Nuclear Training Program will be revised to assure personnel proficiency in the mitigation of BDB events is developed and maintained. These programs and controls will be developed and implemented in accordance with the Systematic Approach to Training (SAT).	Started. Scheduled completion date: September 2014
11	Complete the evaluation of TDAFW pump long term operation with ≤ 290 psig inlet steam pressure.	Complete. TDAFW pump operation and adequate AFW flow to the SGs at SG pressures ≤ 290 psig have been confirmed. (Reference 8)
12	Plant modifications will be completed for permanent plant changes required for implementation of FLEX strategies.	Started. Scheduled completion date: See Milestone Schedule.
13	Details of the ventilation strategy are under development and will conform to the guidance given in NEI 12-06. The details of this strategy will be provided at a later date.	Started. Scheduled completion date: September 2013
14	Complete installation of N-9000 RCP seals in 2 of 3 RCPs in each unit.	Not started. Scheduled completion date is revised from September 2014 to April 2015**
15	Analyses will be performed to develop electrical components performance requirements and confirm electrical loading-related strategy objectives can be met.	Started. Scheduled completion date is revised from September 2013 to December 2013**
16	An evaluation of all BDB equipment fuel consumption and required	Not started.

Overall Integrated Plan Open Item		
OI #	Description	Status
	re-fill strategies will be developed.	Scheduled completion date: June 2014
17	A lighting study will be performed to validate the adequacy of supplemental lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions.	Started. Scheduled completion date: June 2014
18	A communications study will be performed in accordance with the statements made in response to Recommendation 9.3 of the 10 CFR 50.54(f) letter dated March 12, 2012 in Dominion letter S/N 12-207F dated October 29, 2012.**	Started. Scheduled completion date: Consistent with Rec. 9.3 implementation dates.
19	Preferred travel pathways will be determined using the guidance contained in NEI 12-06. The pathways will attempt to avoid areas with trees, power lines, and other potential obstructions and will consider the potential for soil liquefaction.	Started. Scheduled completion date: June 2014
20	The equipment listed in Table 1 will be procured.**	Not started. Scheduled completion date revised from June 2014 to August 2014**

** Refer to Section 8 for an explanation of changes to Open Items.

7 Potential Draft Safety Evaluation Impacts

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

8 Supplemental Information

This supplemental information provides details of changes identified in the status updates above and addresses the following topics: a) Open Item No. 4, b) Open Item No. 15, c) Open Item No. 18, d) Open Item No. 20, e) North Anna Milestone 'Procure Equipment', and f) the addition of Milestone "Validation Walk-throughs or Demonstration of FLEX Strategies and Procedures."

- a) **North Anna, Open Item 4:** The Open Item completion date is revised to October 2013 to be consistent with the revised completion date for the Milestone "Develop Strategies."
- b) **North Anna, Open Item 14:** The Open Item completion date is revised to April 2015 to be consistent with the revised completion date for the Milestone "Unit 1 Outage Implementation."

- c) **North Anna, Open Item 15**: The Open Item completion date is revised to December 2013. Additional time is required to complete the loading/sizing calculations for North Anna Unit 2.
- d) **North Anna, Open Item 18**: The revision to the wording more accurately reflects the planned activities to determine and validate that adequate communications are available to implement FLEX strategies in all phases of the response to an ELAP/LUHS event. The revised Open Item 18 is as follows:

A comprehensive study of communication capabilities is being performed in accordance with the statements made in Dominion letter S/N 12-207F dated October 29, 2012 in response to Recommendation 9.3 of the 10 CFR 50.54(f) letter dated March 12, 2012. The results of this study will identify the communication means available or needed to implement command and control of the FLEX strategies at North Anna. Validation of communications required to implement FLEX strategies will be performed as part of Open Item No. 1.

- e) **North Anna, Open Item 20**: The revision to the wording more accurately reflects the equipment that will be purchased and delivered to the site. The updated completion schedule accurately reflects the Milestone schedule. The revised Open Item and revised completion schedule are as follows:

Open Item 20: The equipment listed in Table 1 will be received on site.
Completion Schedule: August 2014

- f) **North Anna Milestone 'Procure Equipment'**: The revision to the wording more accurately reflects the actual tasks as they occur in sequence. The revised milestone task is the successor to 'Purchase Equipment'. The revised Milestone Task is as follows:

Milestone Task: Receive Equipment

- g) **North Anna Milestone 'Validation Walk-throughs or Demonstration of FLEX Strategies and Procedures'**: This milestone was added for consistency with template and industry formats. It corresponds to the activity previously identified in Open Item No. 1. The scheduled milestone date is the same as the open item completion date. By this date, sufficient FLEX equipment will be available to perform the walk-throughs and procedures will be in a near final form and will rely on the walk-throughs for validation prior to final issuance.

9 References

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

1. Dominion'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)," Serial No. 12-162B, dated February 28, 2013.
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. NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012.
4. Dominion letter 12-162C, "Supplement to Overall Integrated Plan in Response to March 21, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis Events (Order Number EA-12-049)," dated April 30, 2013.
5. WCAP-17601, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs", August 2012.
6. Engineering Technical Evaluation, ETE-CPR-2012-0012, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Revision 1, August 2013.
7. Engineering Technical Evaluation, ETE-NAF-2012-0150, "Evaluation of Core Cooling Coping for Extended Loss of AC Power (ELAP) and Proposed Input for Dominion's Response to NRC Order EA-12-049 for Dominion Fleet," Revision 0, January 2013.
8. Dominion Calculation ME-0968, "Evaluation of the TDAFW Pump Performance at Low Steam Generator Pressures," August 2013.

Table 1 - PWR Portable Equipment Phase 2¹ [Open Item 20]

<i>Use and (potential / flexibility) Diverse Uses</i>						<i>Performance Criteria</i>	<i>Maintenance</i>
<i>List portable equipment</i>	Core	Containment [Open Item 4]	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
BDB High Capacity pump ⁴ (2) and assoc. hoses and fittings	X		X			1200 gpm	Will follow EPRI template requirements
BDB AFW pump ⁴ (3) and assoc. hoses and fittings	X					300 gpm	Will follow EPRI template requirements
BDB RCS Injection pump, (2) and assoc. hoses and fittings	X					40 gpm	Will follow EPRI template requirements
120/240 VAC generators ^{3,5} (3) and associated cables, connectors and switchgear (DGs to re-power instrumentation)				X		35 kW	Will follow EPRI template requirements

Table 1 - PWR Portable Equipment Phase 2¹ [Open Item 20]

<i>Use and (potential / flexibility) Diverse Uses</i>						<i>Performance Criteria</i>	<i>Maintenance</i>
<i>List portable equipment</i>	Core	Containment [Open Item 4]	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
120/240 VAC generators ^{2,5} (8) and associated cables, connectors and switchgear (DGs to provide power to support equipment)					X	5-6.5 kW	Will follow EPRI template requirements
480 VAC generators ^{3,5} (2) and associated cables, connectors and switchgear (re-power battery chargers, inverters, and vital buses)				X		300-350 kW	Will follow EPRI template requirements
Sufficient size and length of pre-terminated cable for connection of 4kV generator to station bus (4 sets)				X	X		

Table 1 - PWR Portable Equipment Phase 2¹ [Open Item 20]							
<i>Use and (potential / flexibility) Diverse Uses</i>						<i>Performance Criteria</i>	<i>Maintenance</i>
<i>List portable equipment</i>	Core	Containment [Open Item 4]	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Portable boric acid batching tanks (2)	X						Will follow EPRI template requirements
Light plants ² (4)					X		Will follow EPRI template requirements
Front end loader ² (1)					X		Will follow EPRI template requirements
Tow vehicles ² (2)					X		Will follow EPRI template requirements
Hose trailer or utility vehicle ² (2)					X		Will follow EPRI template requirements
Fans / blowers ² (10)					X		Will follow EPRI template requirements
Air compressors ² (6)					X		Will follow EPRI template requirements

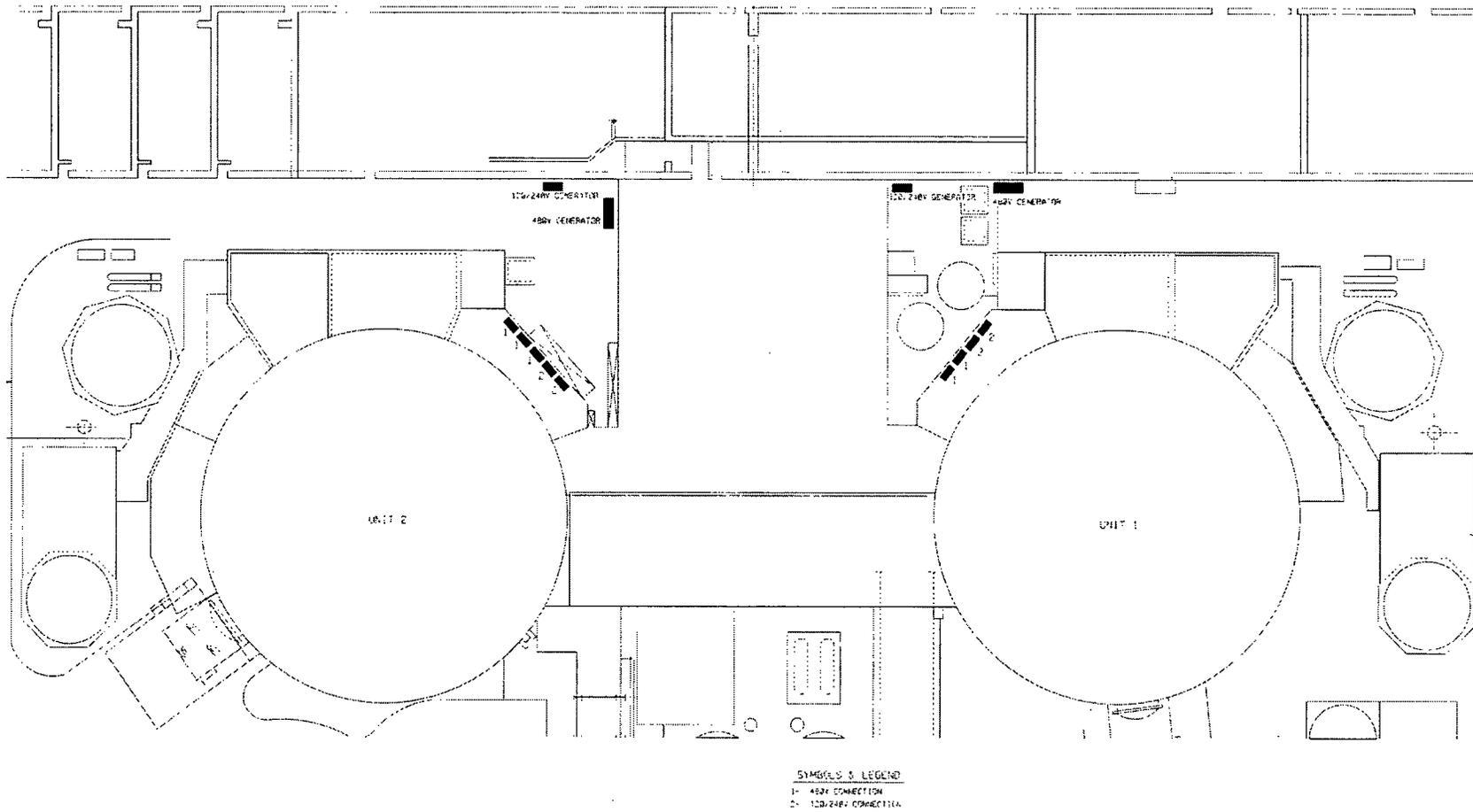
Table 1 - PWR Portable Equipment Phase 2¹ [Open Item 20]

<i>Use and (potential / flexibility) Diverse Uses</i>						<i>Performance Criteria</i>	<i>Maintenance</i>
<i>List portable equipment</i>	Core	Containment [Open Item 4]	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Fuel carts ² with transfer pumps (2)					X		Will follow EPRI template requirements
Communication equipment ⁶					X		Will follow EPRI template requirements
Misc. debris removal equip. ² (2 sets)					X		Will follow EPRI template requirements
Misc. support equipment ² (2 sets)					X		Will follow EPRI template requirements

NOTES:

1. This table is based on one BDB Storage Building.
2. Support equipment. Not required to meet N+1.
3. 480 VAC generators are an alternate strategy to the 120/240 VAC generators. Therefore, only N is required.
4. Preliminary performance criteria. Final performance criteria will be determined by the hydraulic analyses performed in accordance with the design process. [Open Item 5]
5. Preliminary performance criteria. Final performance criteria will be determined by the electrical loading analyses performed in accordance with the design process. [Open Item 15]
6. Equipment purchased in response to the results of the study performed for Recommendation 9.3 of the 10CFR50.54(f) letter dated March 12, 2012

Table 2 - PWR Portable Equipment Phase 3							
<i>Use and (potential / flexibility) Diverse Uses</i>						<i>Performance Criteria</i>	<i>Notes</i>
<i>List portable equipment</i>	Core	Containment [Open Item 2]	SFP	Instrumentation	Accessibility		
4kV generators ¹ (2) and associated cables, connectors and switchgear	X			X		1.6-2 MW	
<p>NOTE:</p> <p>1. Preliminary performance criteria. Final performance criteria will be determined by the electrical loading analyses performed in accordance with the design process. [Open Item 15] RRC equipment will meet the required performance criteria.</p>							



SYMBOLS & LEGEND
1- 480V CONNECTION
2- 120/240V CONNECTION

SEE FIGURE 7B FOR STAGING LOCATIONS OF THE 480V GENERATORS.
THERE ARE NO TIE INSTALLED RECEIPTILES FOR THE 480V CONNECTIONS.

FIGURE 8 (AUGUST 2013 UPDATE)
120/240 AND 480 VAC
ELECTRICAL GENERATOR DEPLOYMENT LAYOUT
NORTH ANNA POWER STATION

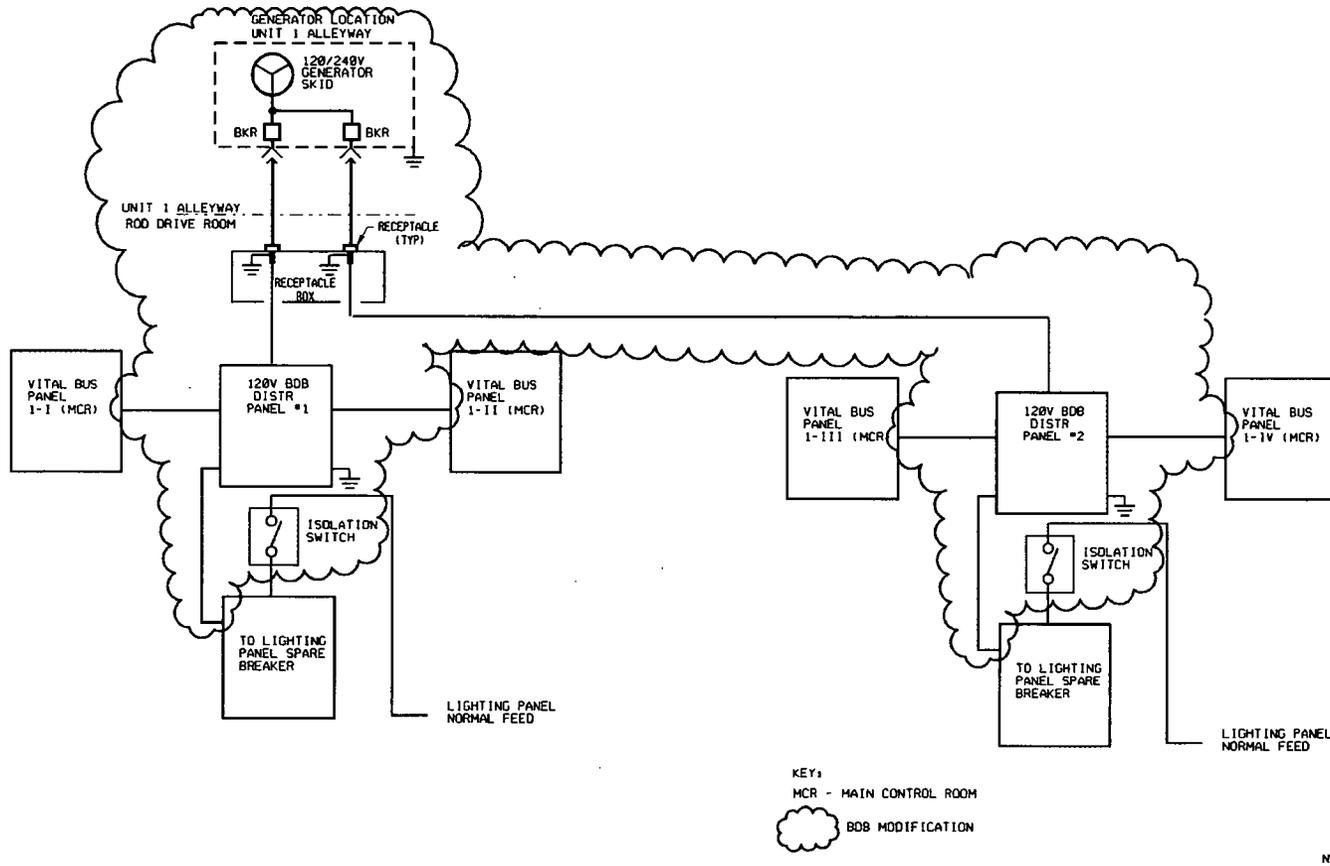


FIGURE 10 (AUGUST 2013 UPDATE)
 120/240 VAC GENERATOR ELECTRICAL CONNECTIONS
 NORTH ANNA POWER STATION