



Order No. EA-12-049

RS-14-013  
RA-14-002

February 28, 2014

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

Oyster Creek Nuclear Generating Station  
Renewed Facility Operating License No. DPR-16  
NRC Docket No. 50-219

Subject: 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)

References:

1. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
4. Exelon Generation Company, LLC's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated October 25, 2012
5. Exelon Generation Company, LLC Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013 (RS-13-023)
6. Exelon Generation Company, LLC First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 28, 2013 (RS-13-125)

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

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

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. Reference 6 provides the first six-month status report pursuant to Section IV, Condition C.2, of Reference 1 for Oyster Creek Nuclear Generating Station. The purpose of this letter is to provide the second six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosed report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28<sup>th</sup> day of February 2014.

Respectfully submitted,



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David P. Helker  
Manager - Licensing & Regulatory Affairs  
Exelon Generation Company, LLC

Enclosure:

1. Oyster Creek Nuclear Generating Station 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

cc: Director, Office of Nuclear Reactor Regulation  
NRC Regional Administrator - Region I  
NRC Senior Resident Inspector – Oyster Creek Nuclear Generating Station  
NRC Project Manager, NRR – Oyster Creek Nuclear Generating Station  
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC  
Mr. Jack R. Davis, NRR/DPR/MSD, NRC  
Mr. Eric E. Bowman, NRR/DPR/MSD, NRC  
Mr. Jeremy S. Bowen, NRR/DPR/MSD/MSPB, NRC  
Mr. Robert L. Dennig, NRR/DSS/SCVB, NRC  
Mr. Peter Bamford, NRR/DPR/MSD/MSPB, NRC  
Manager, Bureau of Nuclear Engineering – New Jersey Department of Environmental  
Protection  
Mayor of Lacey Township, Forked River, NJ



**Enclosure**

**Oyster Creek Nuclear Generating Station**

**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**

(13 pages)

## Enclosure

# Oyster Creek Nuclear Generating 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

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

## 2 Milestone Accomplishments

None

## 3 Milestone Schedule Status

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

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

### Milestone Schedule

Activity	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	October 2012	Complete	
Submit Overall Integrated Plan	February 2013	Complete	
Contract with RRC		Complete	
<b>Submit 6 Month Updates:</b>			
Update 1	August 2013	Complete	
Update 2	February 2014	Complete with this submittal	
Update 3	August 2014	Not Started	
Update 4	February 2015	Not Started	
Update 5	August 2015	Not Started	
Update 6	February 2016	Not Started	
Update 7	August 2016	Not Started	

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Activity	Target Completion Date	Activity Status	Revised Target Completion Date
Submit Completion Report	October 2016	Not Started	
<b>Modification Development &amp; Implementation:</b>			
Modification Development (All FLEX Phases)	August 2015	Not Started	August 2016
Modification Implementation (All FLEX Phases)	October 2016	Not Started	
<b>Procedures:</b>			
Create Site-Specific Procedures	October 2016	Started	
Validate Procedures (NEI 12-06, Sect. 11.4.3)	October 2016	Not Started	
Create Maintenance Procedures	October 2016	Started	
Perform Staffing Analysis	June 2016	Not Started	
Storage Plan and Construction	October 2016	Not Started	
FLEX Equipment Acquisition	October 2016	Started	
Training Completion	October 2016	Not Started	
Regional Response Center Operational	December 2015	Started	December 2014
Unit 1 FLEX Implementation	October 2016	Not Started	
Full Site FLEX Implementation	October 2016	Not Started	

#### 4 Changes to Compliance Method

The following changes / clarifications were made to the Overall Integrated Plan (OIP) and conceptual drawings (Attachment 1) supporting the Overall Integrated Plan compliance method as documented in the last status report. (Reference 1 and Reference 4).

1. Updated conceptual drawing set to clarify and correct submitted OIP drawings.  
Added conceptual drawings for Containment Spray System 2 connection from the FLEX manifold.  
Added the drawing for Fuel Oil transfer connections from the protected / credited Fuel Oil tank.

Note:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the Overall Integrated Plan for Oyster Creek during a scheduled six month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Overall Integrated Plan.

(Attachment 1, Drawing set)

2. Page 19 of 64 of Oyster Creek OIP  
Maintain Core Cooling  
BWR Portable Equipment Phase 2:

Add Reference to MAAP 6  
OC\_FLEX\_CASE6.INP, 1/30/2013

**Explanation of change:** In Phase II after declaration of Extended Loss of AC power (ELAP) the cool down rate transitions from 10°F per hour to 50°F per hour as indicated in the OIP timeline Page 57 of 64. The supporting MAAP run was not referenced.



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3. Change description of  
Page 29 of 64 of Oyster Creek OIP  
Maintain Containment  
BWR Portable Equipment Phase 2

Oyster Creek will utilize portable equipment to provide shell-side makeup to the Isolation Condenser. Utilization of the Isolation Condenser as the RPV Pressure Control Mechanism will eliminate the need for EMRV operation and the subsequent heat addition to the containment.

During Phase 2 Isolation Condenser makeup will be provided by the FLEX pump taking suction from the UHS (Intake or Discharge canal). The pump has the capacity to make up to the Reactor and the Isolation Condenser shells. Connections can also be made from the FLEX manifold (Reactor Building 23' North) to Containment Spray System 2 at a two inch piping connection. The new seismic connections are in the conceptual design phase and will be located inside the Reactor Building North side. This central location will provide connections for the Reactor, Isolation Condenser shell, Containment Spray, and Spent Fuel Pool makeup. The FLEX pump will take suction from the Intake or Discharge canal and hoses will be run to the new connections.

Page 32 of 64 of Oyster Creek OIP  
Added description of connection to Containment Spray System 2

#### **Modifications**

Connections will be added to Core Spray system 1 fire water to Core Spray piping, Isolation Condenser common drain, and Containment Spray System 2 Drywell spray header piping. Electrical connections for the 480VAC USS's will also be made. Connections will be located at a central location at the North side of the Reactor Building. All connections will be accessible from the NW or NE airlocks.



4. Change description of  
Page 38 of 64 of Oyster Creek OIP  
**Maintain Spent Fuel Pool Cooling  
BWR Portable Equipment Phase 2:**

The FLEX diesel driven portable pump will be positioned near the intake structure and the discharge hose will be run to a pipe manifold on Reactor Building 23' North. This manifold will then feed an installed piping riser from Reactor Building 23' to the Reactor Building 95' elevation. The piping riser will terminate at Reactor Building 95' North wall and will have installed valves with hose connections. The piping riser end, located on the Reactor Building 95' North wall, will then be used to make-up to the following using hoses:

- Spent Fuel Pool (SFP) B.5.b diffuser feed connection.
- Spent Fuel Pool 250 gpm spray.
- Isolation Condenser makeup.

On the Reactor Building 95' elevation a hose will run down the North West stair well to the existing B.5.b fuel pool connection. The spent fuel pool B.5.b connection feeds the spent fuel pool diffuser header that supplies water to the fuel pool. At approximately T=12 hours (see spent fuel pool timeline in Phase 1), the FLEX pump will be started, the spent fuel pool make-up piping pressurized, and make-up flow established via the spent fuel pool make-up connection on the 95' piping riser.

The 250 gpm spray flow will be provided by a FLEX pump taking suction from the intake or discharge structure and supply water to the manifold installed on Reactor Building 23' North. The manifold will then supply water to the fuel pool and Isolation Condenser makeup riser (Reactor Building 23' North) that terminates on the Reactor Building 95' North elevation. A hose will be lowered from the Reactor Building 119' South East equipment hatch to connect with an oscillating spray nozzle to spray over the Spent Fuel Pool. This approach is modeled after current B.5.b procedures and approaches the fuel pool from the farthest point possible on the 119' elevation. This approach also considers the current plant procedures for bridge "parking" when the refueling bridge is not in use and the affects of the refueling bridge's location on fuel pool spray patterns.

Evaluation of the Spent Fuel Pool area for steam and condensation has not yet been performed. The results of this evaluation and the vent path strategy, if needed, will be provided in a future six (6) month update.

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

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

## 6 Open Items from Overall Integrated Plan and Draft Safety Evaluation

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

Section Reference	Overall Integrated Plan Open Item	Status
Sequence of events (p. 10-12)	The times to complete actions in the Events Timeline are based on operating judgment, conceptual designs, and current supporting analyses. The final timeline will be time validated once detailed designs are completed and procedures developed.	Not Started
Sequence of events (p. 11-12)	Initial evaluations were used to determine the fuel pool timelines. Formal calculations will be performed to validate this information during development of the spent fuel pool cooling strategy detailed design.	Not Started
Identify how strategies will be deployed in all modes (p. 13)	Transportation routes will be developed from the equipment storage area to the FLEX staging areas. An administrative program will be developed to ensure pathways remain clear or compensatory actions will be implemented to ensure all strategies can be deployed during all modes of operation.  Identification of storage areas and creation of the administrative program are open items.	Not Started
Identify how the programmatic controls will be met (p. 14)	An administrative program for FLEX to establish responsibilities, and testing & maintenance requirements will be implemented.	Started
Maintain Spent Fuel Pool Cooling (p.36)	Complete an evaluation of the spent fuel pool area for steam and condensation.	Not Started
Safety Functions Support (p. 44)	Evaluate the habitability conditions for the Main Control Room and develop a strategy to maintain habitability.	Started
Safety Functions Support (p. 44)	Develop a procedure to prop open battery room doors upon energizing the battery chargers to prevent a buildup of hydrogen in the battery rooms.	Started
Sequence of events (p. 10)	Issuance of BWROG document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines" on 01/31/2013 did not allow sufficient time to perform the analysis of the deviations between Exelon's engineering analyses and the analyses contained in the BWROG document prior to commencing regulatory reviews of the Integrated Plan. This analysis is expected to be completed, documented on Attachment 1B, and provided to the NRC in the August 2013 six month status update.	Completed.



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Section Reference	Overall Integrated Plan Open Item	Status
Baseline coping capability (p. 27)	In response to NRC Order EA-12-049 and implementation of EPG Rev 3, containment venting will be part of the strategies. As part of the B.5.b response Oyster Creek incorporated Extensive Damage Mitigation Guidelines and developed procedure EDMG-SPX9 Manually Opening Containment Vent Valves in a B.5.b Event. This procedure is designed to allow operation of the Hardened Vents with no air supply, AC or DC power available.  Convert EDMG-SPX9 Manually Opening Containment Vent Valves to FSG procedure.	Not Started

Draft Safety Evaluation / Audit Questions Open Item	Status

## 7 Potential Draft Safety Evaluation Impacts

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

## 8 References

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

1. Oyster Creek Nuclear Generating Station's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 28, 2013.
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, Rev. 0, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, dated August 2012.
4. Oyster Creek Nuclear Generating Station's, First Six Month Status Report for the Implementation of FLEX dated August 28, 2013.

## 9 Attachments

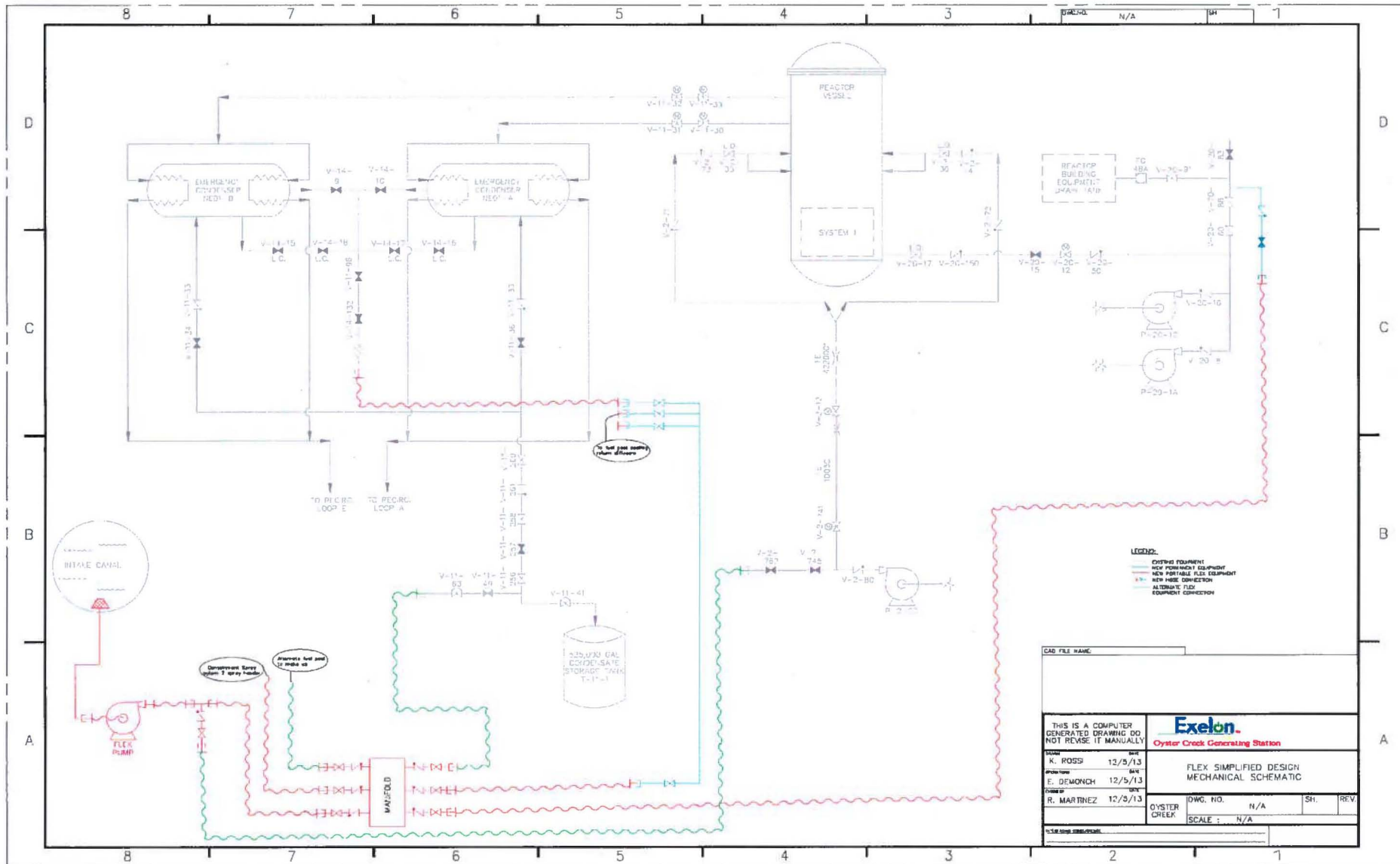
Attachment 1. Updated Conceptual Design Drawings



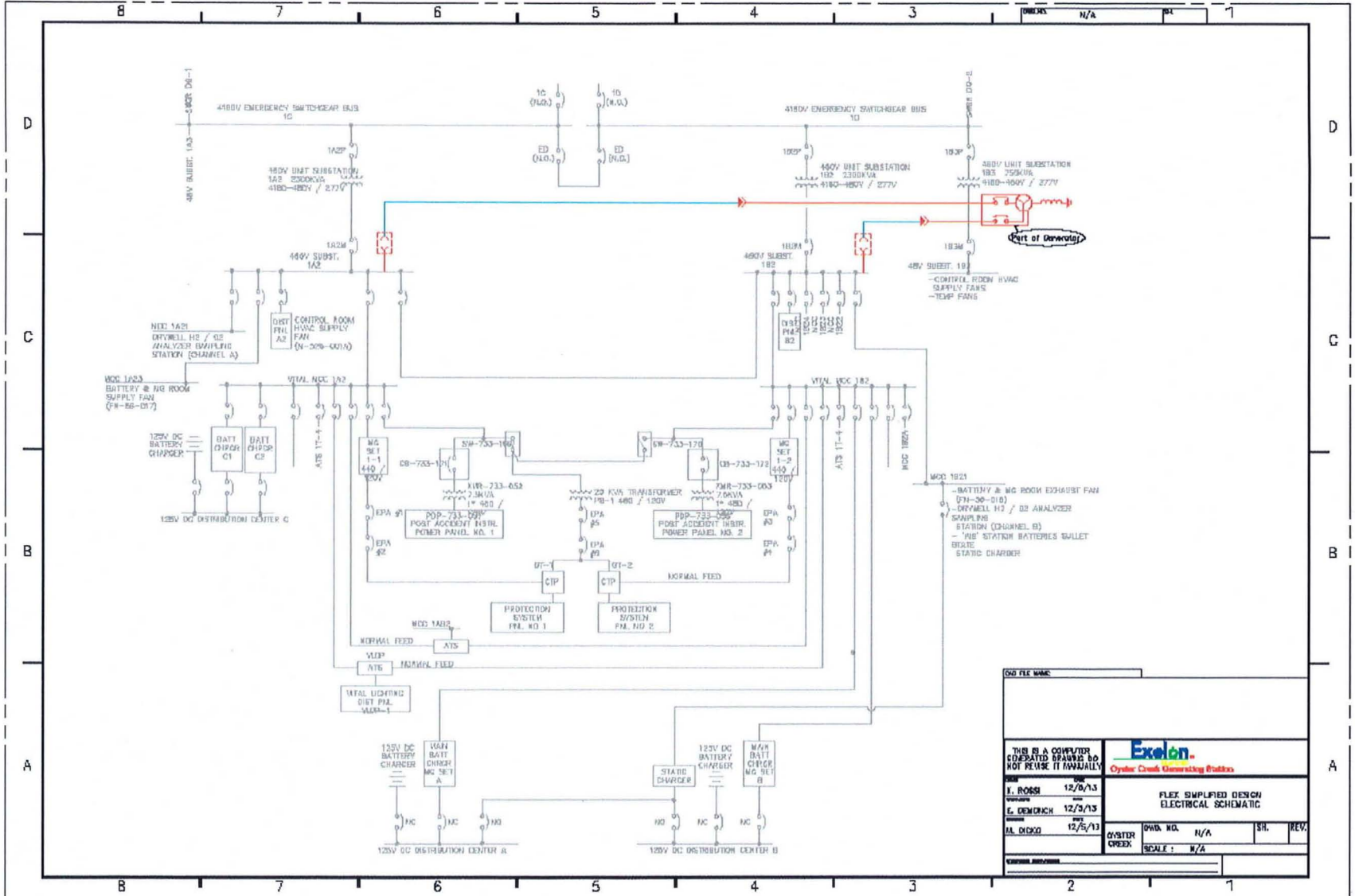
**Attachment 1.**

**Updated Conceptual Design Drawings:**

# Oyster Creek Nuclear Generating Station Second Six Month Status Report for the Implementation of FLEX February 28, 2013



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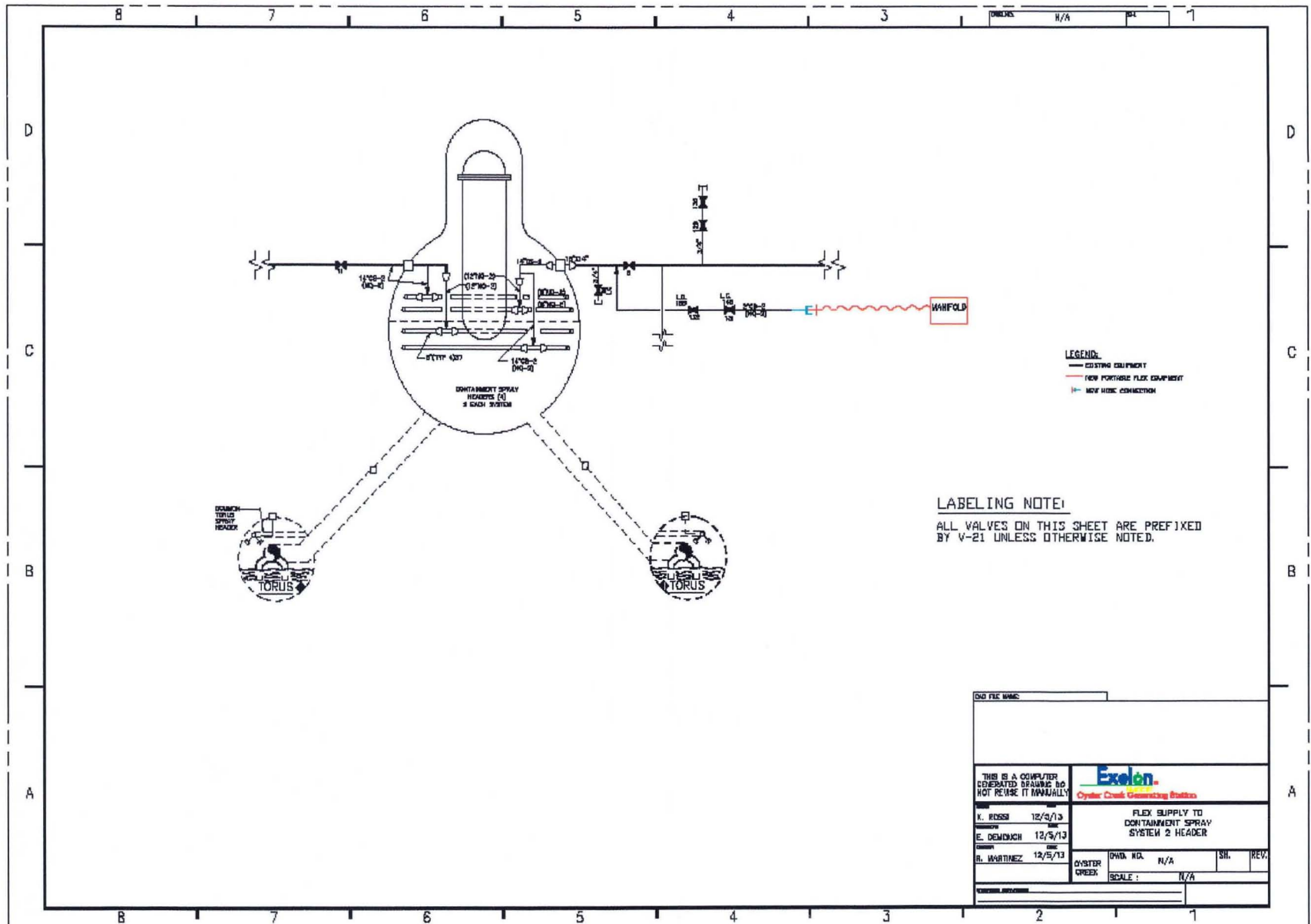
**Exelon**  
 Oyster Creek Generating Station

DESIGNED BY <b>J. ROSS</b>	DATE 12/0/13	PROJECT <b>FLEX SIMPLIFIED DESIGN ELECTRICAL SCHEMATIC</b>	
CHECKED BY <b>E. DEMORICH</b>	DATE 12/3/13	OWNER <b>OYSTER CREEK</b>	SCALE N/A
DATE 12/5/13	APP. NO. N/A	SHEET NO. N/A	REV. N/A

SCALE: N/A



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