



Order No. EA-12-049

RS-13-123

August 28, 2013

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

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: 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)

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-13-022)
6. NRC Order Number EA-12-050, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents," dated March 12, 2012
7. NRC Order Number EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013

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 Limerick Generating Station, Units 1 and 2 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. The purpose of this letter is to provide the first 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.

As described in Reference 5, full implementation of NRC Order EA-12-049 required mitigation strategies is dependent upon implementation of reliable hardened containment venting capability established in accordance with NRC Order EA-12-050 (Reference 6). NRC Order EA-13-109 (Reference 7) issued by the NRC on June 6, 2013, rescinded the requirements of Order EA-12-050 and established revised schedule timelines and implementation dates for reliable hardened containment vents capable of operation under severe accident conditions. The revised schedule and implementation timeline contained in Order EA-13-109 delays the ability to achieve full implementation of the mitigation strategy requirements of Order EA-12-049. This need for relaxation from the implementation requirements of Order EA-12-049 is described in Section 5 of the enclosed update report. The request for relaxation of the full implementation schedule requirements of Order EA-12-049 will be submitted separately.

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of August 2013.

Respectfully submitted,



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

Enclosure:

1. Limerick Generating Station, Units 1 and 2 First 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 - Limerick Generating Station, Units 1 and 2
NRC Project Manager, NRR - Limerick Generating Station, Units 1 and 2
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
Mr. Robert J. Fretz, Jr, NRR/JLD/PMB, NRC
Mr. Robert L. Dennig, NRR/DSS/SCVB, NRC
Mr. Eric E. Bowman, NRR/DPR/PGCB, NRC
Director, Bureau of Radiation Protection – Pennsylvania Department of Environmental Resources
R. R. Janati, Commonwealth of Pennsylvania

bcc: Site Vice President - Limerick Generating Station, Units 1 and 2
Vice President Operations Support
Plant Manager, Limerick Generating Station, Units 1 and 2
Site Engineering Director – Limerick Generating Station, Units 1 and 2
Regulatory Affairs Manager
Regulatory Assurance Manager - Limerick Generating Station, Units 1 and 2
Severe Accident Management Director
Site Operations Director - Limerick Generating Station, Units 1 and 2
Corporate Licensing Manager - East
Corporate Licensing Director - East
Exelon Records Management
Vinod Aggarwal
Steven Pierson
David Schupp
Craig Markle
PA DEP BRP Inspector - LGS

Enclosure

Limerick Generating Station, Units 1 and 2

**First 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**

(11 pages)

Enclosure

Limerick Generating Station, Units 1 and 2 First Six Month Status Report for the Implementation of Order EA-12-049, Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

1 Introduction

Limerick Generating Station, Units 1 and 2 developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049 (Reference 2). This enclosure provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, 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 (Reference 1). 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 target completion dates impact the order implementation date. An explanation of the impact of these changes is provided in Section 5 of this enclosure.

Milestone Schedule

Site: Limerick Generating Station

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	October 2012	Complete	
Submit 6 Month Updates:			
Update 1	August 2013	Complete with this submittal	
Update 2	February 2014	Not Started	
Update 3	August 2014	Not Started	
Update 4	February 2015	Not Started	
Update 5	August 2015	Not Started	
Update 6	February 2016	Not Started	

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Activity	Target Completion Date	Activity Status	Revised Target Completion Date
Update 7	August 2016	Not Started	
Submit Completion Report	April 2016	Not Started	April 2018
Modification Development & Implementation:			
Unit 1 Modification Development (All FLEX Phases)	February 2015	Started	
Unit 1 Modification Implementation (All FLEX Phases)	April 2016	Not Started	
Unit 2 Modification Development (All FLEX Phases)	March 2014	Started	
Unit 2 Modification Implementation (All FLEX Phases)	April 2015	Not Started	
Procedures:			
Create Site-Specific Procedures	April 2015	Not Started	
Validate Procedures (NEI 12-06, Sect. 11.4.3)	February 2015	Not Started	
Create Maintenance Procedures	April 2015	Not Started	
Perform Staffing Analysis	Nov 2014	Not Started	
Storage Plan and Construction	April 2015	Started	
FLEX Equipment Acquisition	April 2015	Started	
Training Completion	April 2015	Not Started	
Regional Response Center Operational	Dec 2014	Started	
Unit 1 FLEX Implementation	April 2016	Started	See Section 5 of this enclosure.
Unit 2 FLEX Implementation	April 2015	Started	See Section 5 of this enclosure.
Full Site FLEX Implementation	April 2016	Started	See Section 5 of this enclosure.

4 Changes to Compliance Method

Attachment 3 of Reference 1 contained conceptual sketches of the water supply and electrical power supply strategies. On the mechanical sketch, a FLEX pump is shown supplying water to the RHR to Fire Water Connection (B.5.b). This was not described in the body of the integrated plan since this was an initial conceptual design that was evaluated and determined to not be the optimal alternate strategy. In addition, a FLEX pump is shown bypassing the existing Suppression Pool Cleanup pump. This was also not described in the body of the integrated plan since this was an initial conceptual design that was evaluated and determined to not be an optimal strategy. These changes are shown in Attachment 1a (Unit 1) and Attachment 1b (Unit 2).

On the electrical sketch, a power supply from the FLEX Generators was shown to the suppression pool cleanup pumps. This was not described in the body of the integrated plan since this was an initial conceptual design that was evaluated and determined to not be an optimal strategy. These changes are shown in Attachment 1c.

No other changes to the FLEX strategies have been identified at this time.

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

This section provides a summary of needed relief/relaxation only. The specific details will be submitted in a separate document.

NRC Order EA-12-049 requires implementation of Mitigation Strategies to include procedures, guidance, training, and acquisition, staging, or installing of equipment needed for the strategies. The Overall Integrated Plan (Reference 1) provided the Limerick Generating Station response to NRC Order EA-12-049. The cover letter identifies that delays in implementing the Hardened Containment Vent System as required by NRC Order EA-13-109 will also affect implementation of the Mitigation Strategies Order EA-12-049 actions.

The Overall Integrated Plan (Reference 1) enclosure describes the Limerick Generating Station Mitigation Strategies that are based on venting the containment using the Hardened Containment Vent System. It also describes that a modification to install a Hardened Containment Vent System (HCVS) is required. Thus, the Limerick Generating Station NRC Order EA-12-049 response provided in Reference 1 was premised on installation and use of a Hardened Containment Vent System as required by NRC Order EA-12-050.

Upon issuance of NRC Order EA-13-109, the NRC staff changed technical and schedule requirements applicable to the Hardened Containment Vent System and rescinded the requirements of NRC Order EA-12-050.

As a result, full compliance to the Mitigation Strategies required by NRC Order EA-12-049 and described in Reference 1 for Limerick Generating Station Units 1 and 2 will not be achieved until compliance to NRC Order EA-13-109 is achieved. Relief/relaxation from the NRC Order EA-12-049 IV.A.2 requirements is required.

Limerick Generating Station will be in compliance with the aspects of the Reference 1, Unit 1 and Unit 2 Mitigation Strategies that do not rely upon a Hardened Containment Vent System unless otherwise described.

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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. 8)	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. 7) Installed Phase 1 Equipment (p.37)	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
Sequence of Events (p. 7)	Analysis of deviations between Exelon's engineering analyses and the analyses contained in BWROG Document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines" and documentation of results was not completed and submitted with the Overall Integrated Plan (Reference 1).	Completed. Attachment 2 included with this six month update.
Identify how strategies will be deployed in all modes (p. 11)	<p>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.</p> <p>Identification of storage areas and creation of the administrative program are open items.</p>	Not Started

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Section Reference	Overall Integrated Plan Open Item	Status
Identify how the programmatic controls will be met (p. 12)	An administrative program for FLEX to establish responsibilities, and testing & maintenance requirements will be implemented.	Not Started
Sequence of Events (p. 9)	Additional work will be performed during detailed design development to ensure Suppression Pool temperature will support RCIC operation, in accordance with approved BWROG analysis, throughout the event.	Not Started
Portable Equip Phase 2 (p. 50)	Complete an evaluation of the spent fuel pool area for steam and condensation.	Not Started
Installed Equip Phase 1 (p.47) Portable Equip Phase 2 (p. 49)	Evaluate the habitability conditions for the Main Control Room and develop a strategy to maintain habitability.	Not Started
Installed Equip Phase 1 (p.47) Portable Equip Phase 2 (p. 50)	Develop a procedure to prop open battery room doors upon energizing the battery chargers to prevent a buildup of hydrogen in the battery rooms.	Not Started

Draft Safety Evaluation Open Item	Status
N/A	N/A

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. Limerick Generating Station Units 1 and 2, "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-13-022).
2. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.

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3. NRC Order EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013.
4. LG-MISC-012, MAAP Analysis to Support FLEX Initial Strategy, Revision 1.
5. NEDC-33771P, GEH Evaluation of FLEX Implementation Guidelines, Revision 1, January 2013.
6. NRC Order EA-12-050, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents," dated March 12, 2012.
7. LGS UFSAR, Revision 16.

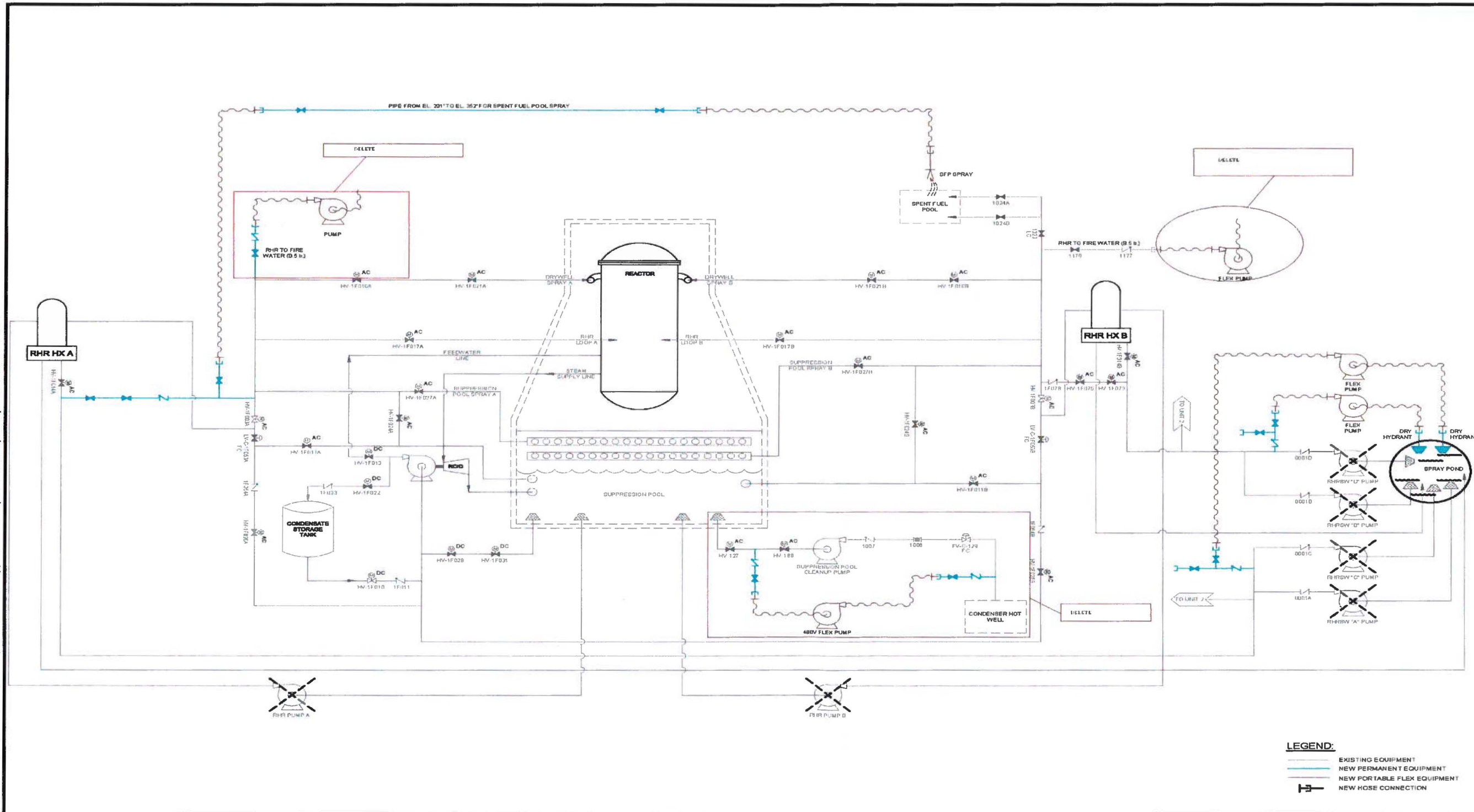
9 Attachments

- 1a – Simplified FLEX Design Mitigation Strategies, Unit 1, Mechanical Schematic
- 1b – Simplified FLEX Design Mitigation Strategies, Unit 2, Mechanical Schematic
- 1c – Simplified FLEX Design Mitigation Strategies, Units 1 and 2, Electrical Schematic
- 2 – NSSS Significant Reference Analysis Deviation Table

Limerick Generating Station, Units 1 and 2 First Six Month Status Report for the Implementation of FLEX
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Attachment 1a

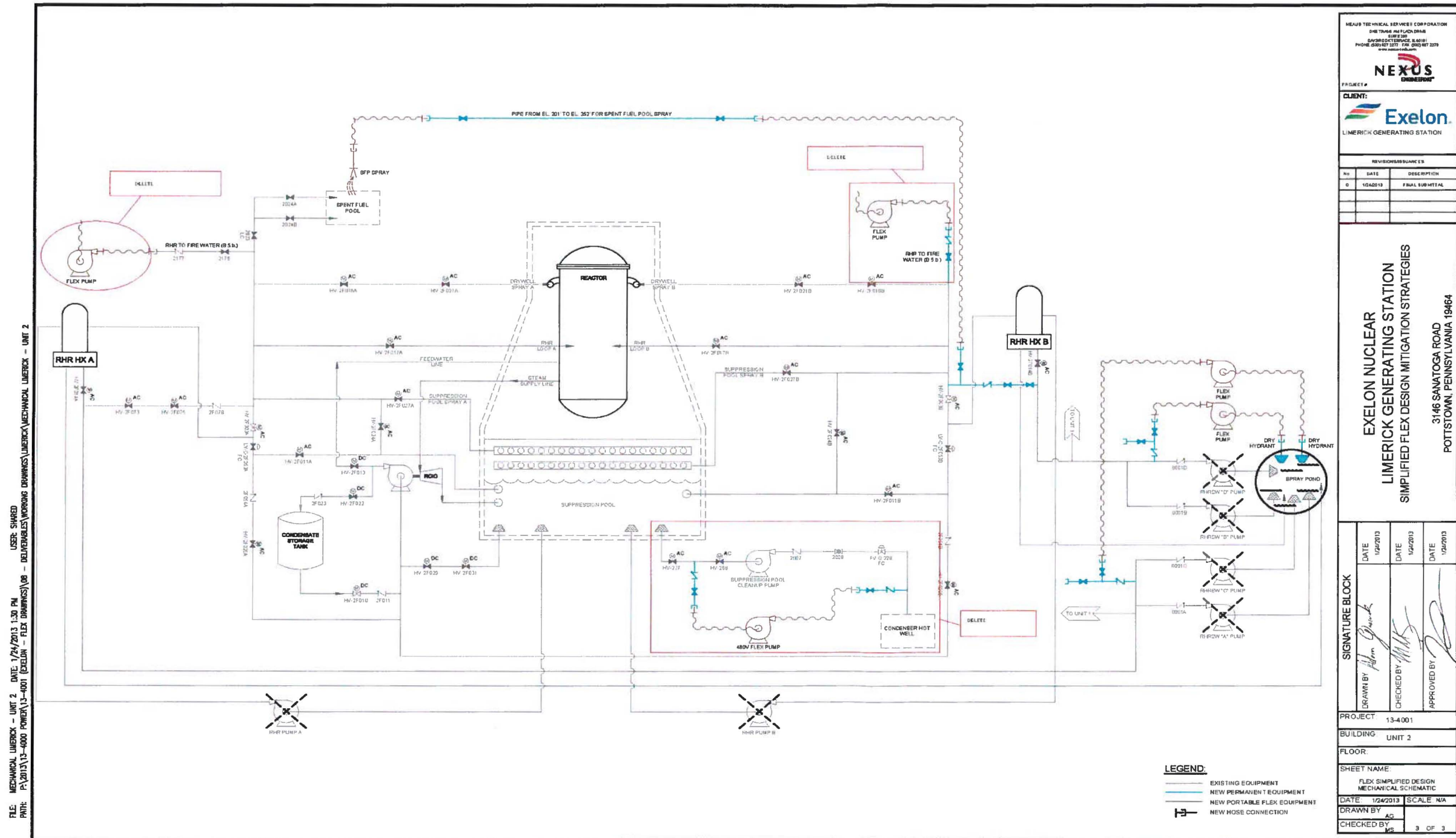
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NEXUS TECHNICAL SERVICES CORPORATION ONE TRISTAR PLAZA SUITE 200 DAVENPORT, PENNSYLVANIA 19340 PHONE: (610) 877-2277 FAX: (610) 877-3378 www.nexuscorp.com		
NEXUS ENGINEERING		
PROJECT # Exelon LIMERICK GENERATING STATION		
REVISIONS/ISSUES		
No.	DATE	DESCRIPTION
1	1/24/2013	FINAL SUBMITTAL
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<i>Adam Quirk</i>	1/24/2013	
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<i>MS</i>	1/24/2013	
APPROVED BY	DATE	
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FLEX SIMPLIFIED DESIGN MECHANICAL SCHEMATIC		
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Attachment 1b



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NEAUX TECHNICAL SERVICES CORPORATION
 ONE THREE ONE FOUR FOUR
 1318 2ND ST
 BAYBROOK TOWNSHIP, PA 15115
 PHONE (610) 827-3377 FAX (610) 827-3378

NEXUS
ENGINEERING

CLIENT:
Exelon
 LIMERICK GENERATING STATION

NO.	DATE	DESCRIPTION
0	10/20/13	FINAL SUBMITTAL

EXELON NUCLEAR
 LIMERICK GENERATING STATION
 SIMPLIFIED FLEX DESIGN MITIGATION STRATEGIES

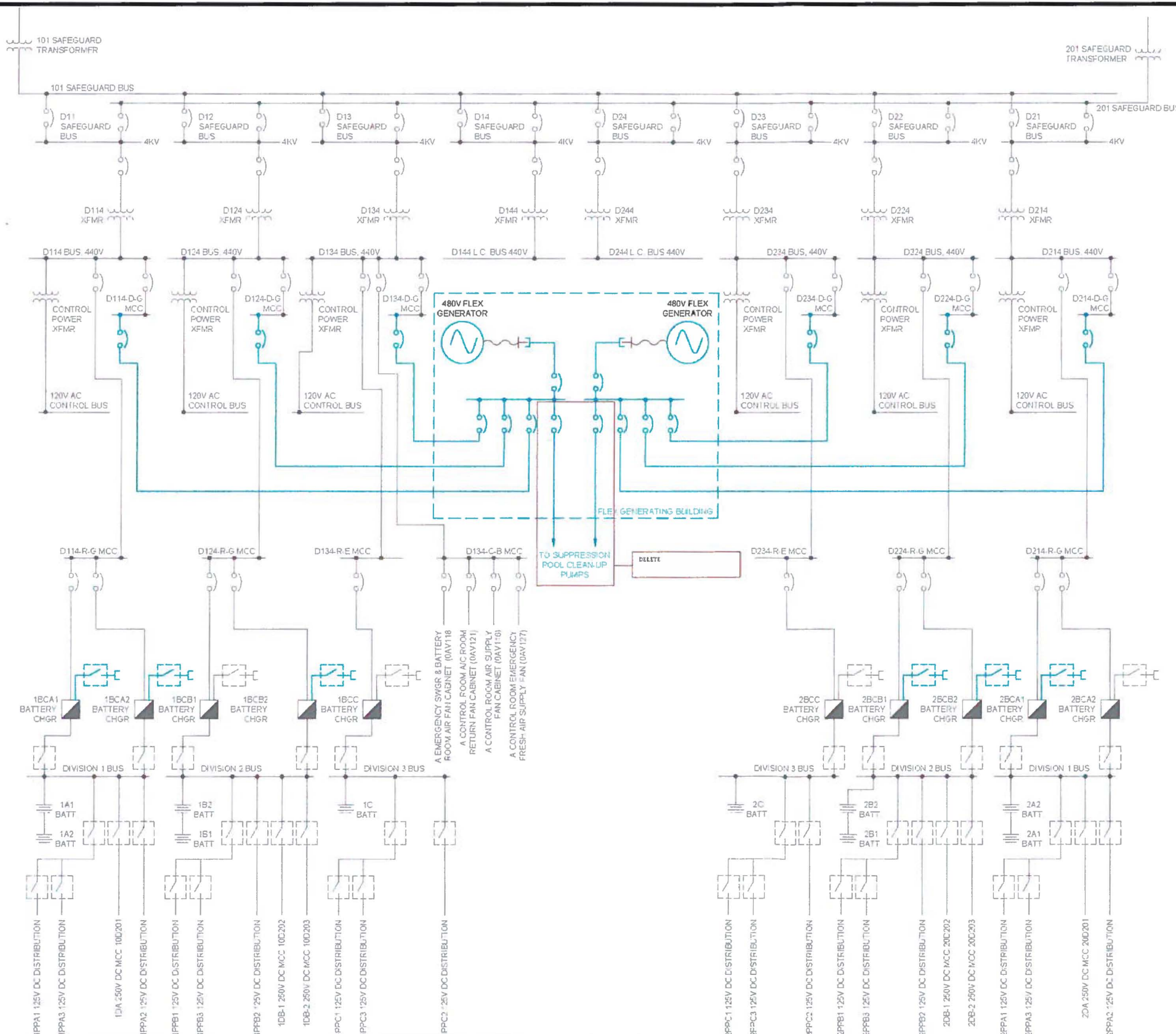
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Limerick Generating Station, Units 1 and 2 First Six Month Status Report for the Implementation of FLEX
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Attachment 1c



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NEVIS TECHNICAL SERVICES CORPORATION
 ONE TRINE AVENUE
 SUITE 200
 CHESTER, PENNSYLVANIA 19381
 PHONE: (610) 827-2277 FAX: (610) 827-2278
 www.nevis.com

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PROJECT #

CLIENT:
Exelon
 LIMERICK GENERATING STATION

REVISIONS		
NO.	DATE	DESCRIPTION
0	12/26/13	FINAL SUBMITTAL

EXELON NUCLEAR
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 SIMPLIFIED FLEX DESIGN MITIGATION STRATEGIES

3146 SANATOGA ROAD
 POTTSTOWN, PENNSYLVANIA 19464

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APPROVED BY <i>MS</i>	DATE 1/24/2013

PROJECT: 13-4001
 BUILDING: UNIT 1 & UNIT 2
 FLOOR:

SHEET NAME:
 FLEX SIMPLIFIED DESIGN
 ELECTRICAL SCHEMATIC

DATE: 1/24/2013 SCALE: NA
 DRAWN BY: AC
 CHECKED BY: MS 1 OF 3

Attachment 2

NSSS Significant Reference Analysis Deviation Table

Item	Parameter of Interest	NEDC-33771P Rev 1 Value	NEDC- 33771P Page	Plant Applied Value (Reference 4, Case 2)
<p>NEDC-33771P Rev 1 Section 4.5.1.4 and 4.5.2.6 define the inputs and results that are closest to the LGS MAAP inputs and results (WW Venting, Suction from Suppression Pool). The LGS model assumed a 10" wetwell vent. The results will be listed from the GEH report for the 8" and 12" wetwell vent. Differences between the GEH SHEX case and the MAAP analysis of the Limerick FLEX strategy (Reference 4, Case 2) are listed below.</p>				
Input Parameter Values				
1	Core thermal power	Note 1	18	3515 MWT
2	Primary System Leakage	Note 1	18	36 gpm
3	RPV Depressurization Rate	Note 1	18	250°F/hr
4	Drywell Free Volume	Note 1	18	243,580 ft ³
5	Initial Drywell Temperature	Note 1	18	135°F
6	Initial Drywell Pressure	Note 1	18	15.45 psia
7	Initial Drywell Humidity	Note 1	18	20%
8	Wetwell Free Volume	Note 1	18	158,253 ft ³
9	Initial Wetwell Pressure	Note 1	18	15.45 psia
10	Suppression Pool Volume	Note 1	18	123,407 ft ³
11	Initial Suppression Pool Temperature	Note 1	18	95°F
12	RCIC Suction Source	Suppression Pool	18	Suppression Pool
13	Time of WW Venting	Note 1	18	5.8 hours

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Attachment 2

NSSS Significant Reference Analysis Deviation Table

NEDC-33771P Rev 1 Section 4.5.1.4 and 4.5.2.6 define the inputs and results that are closest to the LGS MAAP inputs and results (WW Venting, Suction from Suppression Pool). The LGS model assumed a 10" wetwell vent. The results will be listed from the GEH report for the 8" and 12" wetwell vent. Differences between the GEH SHEX case and the MAAP analysis of the Limerick FLEX strategy are listed below.

Results		SHEX			MAAP
		8" Vent	12" Vent	Page	10" Vent
1	Maximum Suppression Pool Temperature	Note 1	Note 1	23, 24	234°F at 19 hours
2	Maximum Wetwell Temperature	Note 1	Note 1	23, 24	Not Available
3	Maximum Wetwell Pressure	Note 1	Note 1	23, 24	Not Available
4	Maximum Drywell Temperature	Note 1	Note 1	23, 24	233°F at 3.4 hours, 247°F at 72 hours
5	Maximum Drywell Pressure	Note 1	Note 1	23, 24	27 psia at 5.8 hours

Note 1: The values are GEH proprietary values and have been excluded from this report. The values can be found in NEDC-33771P.