



August 28, 2014  
RC-14-0144

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

Dear Sir/Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1  
DOCKET NO. 50-395  
OPERATING LICENSE NO. NPF-12  
SOUTH CAROLINA ELECTRIC & GAS COMPANY'S THIRD 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) (TAC NO. MF2338)

- 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. South Carolina Electric & Gas 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 17, 2012
  5. South Carolina Electric & Gas Company's Overall Integrated Plan as Required by 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

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to South Carolina Electric & Gas Company (SCE&G). Reference 1 was immediately effective and directs SCE&G 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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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 SCE&G initial status report regarding mitigation strategies. Reference 5 provided the SCE&G 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 directions regarding the content of the status reports. The purpose of this letter is to provide the third 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 attached 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 Bruce L. Thompson at (803) 931-5042.

I certify under penalty of perjury that the foregoing is true and correct.

8/28/14  
Executed on

Thomas D. Gatlin  
Thomas D. Gatlin

TS/TDG/rp

Attachment: South Carolina Electric & Gas Company's Third 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

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PRSF (RC-14-0144)

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**VIRGIL C. SUMMER NUCLEAR STATION UNIT 1  
DOCKET NO. 50-395  
OPERATING LICENSE NO. NPF-12**

**ATTACHMENT**

**SOUTH CAROLINA ELECTRIC & GAS COMPANY'S THIRD 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**

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## 1 Introduction

South Carolina Electric & Gas Company (SCE&G) developed an Overall Integrated Plan (Reference 1 in Section 8), first six-month status report (Reference 3 in Section 8), and second six-month status report (Reference 4 in Section 8) documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment 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. This update also incorporates Virgil C. Summer Nuclear Station's (VCSNS) additional responses to NRC's Mitigating Strategies Regulatory Audit Questions and Interim Staff Evaluation (Reference 5 in Section 8)

## 2 Milestone Accomplishments

The following milestone(s) have been completed since the development of the Overall Integrated Plan (Reference 1), and are current as of August 18, 2014.

The development of the FLEX Strategies have been completed and provided as input to the scoping of the FLEX Modification Engineering development.

## 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.

Validation: No RAIs have been issued to VCSNS relative to the FLEX Overall Integrated Plan.

Walk-through(s) or Demonstration(s) – Completion of training implementation precedes completing the walk-throughs and demonstration of the FLEX Support Guidelines scheduled for August 2015.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	Oct 2012	Complete	
Submit Overall Integrated Plan	Feb 2013	Complete	
<b>Submit 6 Month Updates:</b>			
Update 1	Aug 2013	Complete	
Update 2	Feb 2014	Complete	
Update 3	Aug 2014	Complete	
Update 4	Feb 2015	Not Started	
Update 5	Aug 2015	Not Started	
Update 6	Feb 2016	Not Started	
Update 7	Aug 2016	Not Started	
FLEX Strategy Evaluation	Aug 2013	Complete	
Walk-throughs or Demonstrations	Aug 2015	Not Started	

<b>Milestone</b>	<b>Target Completion Date</b>	<b>Activity Status</b>	<b>Revised Target Completion Date</b>
Perform Staffing Analysis	Jul 2014	In Progress	Mar 2015
<b>Modifications:</b>			
Modifications Evaluation	Dec 2013	Complete	
Unit 1 Design Engineering Evaluation	Jan 2015	In Progress	
Unit 1 Implementation Outage	Nov 2015	Not Started	
<b>Storage:</b>			
Design Storage Building	Jul 2014	In Progress	Feb 2015
Storage Implementation	Jul 2015	In Progress	
<b>FLEX Equipment:</b>			
Procure On-Site Equipment	Oct 2014	In Progress	
Develop Strategies with RRC	Nov 2014	In Progress	
Install Off-Site Delivery Station (if Necessary)	Aug 2013	Complete	
<b>Procedures:</b>			
PWROG issues NSSS-specific guidelines	May 2013	Complete	
Create Site-Specific FSGs	Feb 2014	In Progress	Feb 2015
Create Maintenance Procedures	Oct 2014	In Progress	Jan 2015
<b>Training:</b>			
Develop Training Plan	Jan 2015	In Progress	
Training Complete	Jul 2015	Not Started	
Unit 1 FLEX Implementation	Nov 2015	Not Started	
Submit Completion Report	Jan 2016	Not Started	

#### **4 Changes to Compliance Method**

This section describes and documents changes to the information provided in the SCE&G Overall Integrated Implementation Plan that meet NEI 12-06 compliance methods and addresses the Mitigating Strategies Regulatory Audit Questions and the Interim Staff Evaluation. Each change is listed with the justification provided.

##### ***In Section 1: Determine Applicable Hazards:***

1A. Subsection "High Wind" was revised to clarify that considerations 1 and 2 of NEI 12-06 Section 7.3.2 are applicable and address how the mitigation plan addresses these considerations.

*Justification: This change is in response to Audit Question #9 and Interim Staff Evaluation Confirmatory Item 3.1.3.2.A.*

***In Section 4: Sequence of Events and Technical Basis:***

4A. Subsection “General” paragraph 2 was revised to reference the boration calculation and documents a 21 hour timeframe needed to complete boron addition.

*Justification: This change reflects new analysis completed*

4B. Subsection “Table Item 25 – Begin Boration” was revised to reference the boration calculation and documents a 21 hour timeframe needed to complete boron addition.

*Justification: This change reflects new analysis completed*

***In Section 10: Maintain Core Cooling & Heat Removal:***

10A. The note in subsection “Maintain Core Cooling & Heat Removal: Phase 1 Details” was expanded to clarify that only the Condensate Storage Tank (CST) volume and piping required to maintain technical specification minimum volume survives the seismic event.

*Justification: This change clarifies the basis for available CST volume following a seismic event.*

10B. The first three paragraphs in subsection “Maintain Core Cooling & Heat Removal: PWR Portable Equipment Phase 2” were re-written to clarify that the turbine driven emergency feedwater (TDEFW) pump is not a phase two strategy and to reinforce the importance of repowering the motor driven emergency feedwater (MDEFW) as the primary strategy for phase 2.

*Justification: This change clarifies that Phase 2 relies on repowering a MDEFW pump in the event that the TDEFW pump fails or when ample steam is no longer available to drive the TDEFW pump’s turbine.*

10C. Subsection “Maintain Core Cooling & Heat Removal: PWR Portable Equipment Phase 2, Primary Strategy” was expanded to confirm that accessibility and connection points for the primary strategy are protected from all applicable hazards.

*Justification: This change is in response to Audit Question #43 and Interim Staff Evaluation Confirmatory Item 3.1.1.2.B.*

10D. Throughout the section, the “FLEX SG Makeup pump” was renamed the “FLEX SG Feed pump” to be consistent with the actual equipment name.

*Justification: This change is editorial and for consistency.*

10E. In subsection “Maintain Core Cooling & Heat Removal: PWR Portable Equipment Phase 2, SG Makeup/FLEX Feed Header,” the third paragraph was revised to clarify that the AB rollup door on the north side of the plant protects the AB area from direct impacts of high winds and associated missiles.

*Justification: This change is in response to Audit Question #43 and Interim Staff Evaluation Confirmatory Item 3.1.1.2.B.*

10F. In Subsection "*Phase 2 Details*," the "*Identify modifications*" section was revised to clarify the flow rate for the FLEX ultimate heat sink (UHS) pump to reflect the increased flow rate identified in the pump specification and to clarify the strategy to repower either vital bus with the FLEX combustion turbine generators (CTGs).

*Justification: This change provides improved and more accurate flow rates for the FLEX UHS Pump and clarifies that capability of the FLEX CTGs.*

***In Section 11: Maintain RCS Inventory Control:***

11A. Subsection "*Maintain RCS Inventory Control: PWR Installed Equipment Phase 1*" has been revised to change the time required for boration addition to 21 hours after shutdown and boration injection is expected to start before 17 hours after the shutdown. A new calculation documenting the boration rates, sources, and pumps was also referenced.

*Justification: This change reflects new analysis completed*

11B. Subsection "*Maintain RCS Inventory Control: PWR Installed Equipment Phase 1*" has been expanded to include a statement confirming the use of Pressurized Water Reactor Owners Group (PWROG) position paper on boron mixing.

*Justification: This change is in response to Audit Question #15 and Interim Staff Evaluation Confirmatory Item 3.2.1.8.A.*

11C. Subsection "*Maintain RCS Inventory Control: PWR Portable Equipment Phase 2*" have been revised to reflect that access and connections for the FX RCS MU PUMP are within structures protected from all applicable hazards.

*Justification: This change is in response to Audit Question #43 and Interim Staff Evaluation Confirmatory Item 3.1.1.2.B.*

11D. Subsection "*Maintain RCS Inventory Control: PWR Portable Equipment Phase 2*" has been expanded to address boric acid precipitation challenges.

*Justification: This change is in response to Audit Question #57 and Interim Staff Evaluation Confirmatory Item 3.2.4.3.A.*

11E. Subsection "*Maintain RCS Inventory Control: PWR Portable Equipment Phase 3, Phase 3 Deployment Conceptual Design*" have been changed to reflect that mobile boration is not needed from the Regional Response Center and that the boration strategy for phase 3 is the same as phase 2.

*Justification: This change clarifies that no mobile boration system is required for success of RCS Inventory Control strategy.*

***In Section 12: Maintain Containment:***

12A. Subsection "*Maintain Containment: PWR Portable Equipment Phase 3*" has been revised to reflect that access and connections for containment cooling are within structures protected from all applicable hazards.

*Justification: This change is in response to Audit Question #43 and Interim Staff Evaluation Confirmatory Item 3.1.1.2.B.*

***In Section 13: Maintain Spent Fuel Cooling:***

13A. Subsections "*Maintain Spent Fuel Cooling: PWR Portable Equipment Phase 2*" has been revised to reflect that access and connections for spent fuel pool (SFP) make-up connections are within structures protected from all applicable hazards and to document and reference Beyond Design Basis Mitigating Guideline strategies for SFP makeup and spray.

*Justification: This change is in response to Audit Question #16 and Interim Staff Evaluation Confirmatory Item 3.2.2.A.*

13B. Subsections "*Phase 2 Details*" has been revised to reflect that a minimum of 120 gpm SFP makeup flow is required to allow for boil-off and provide fill margin.

*Justification: This change is in response to Audit Question #16 and Interim Staff Evaluation Confirmatory Item 3.1.1.2.B.*

***In Section 14: Safety Function Support:***

14A. Subsection "*Safety Function Support: PWR Installed Equipment Phase 1: Station 125VDC Batteries supplying DC and 120VAC vital AC*" has been revised to include a statement confirming the use of the NEI position paper on battery life.

*Justification: This change is in response to Interim Staff Evaluation Confirmatory Item 3.2.4.10.B.*

***In References:***

The following reference was revised:

- 35. VCSNS Calculation DC00080-001 Revision 1

The following reference was corrected:

- 43. U. S. Nuclear Regulatory Commission (NRC) letter to NEI (Jack Stringfellow) endorsing Westinghouse position paper entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG)", dated January 8, 2014



The following references were added:

46. Westinghouse Position Paper entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG)", dated August 16, 2013
47. VCSNS Calculation DC00080-003
48. VCSNS BDMG-1.0 Spent Fuel Pool Makeup and Spray Strategies

#### ***In Attachment 1A: Sequence of Events Timeline***

Action Items 18 and 25 were revised to reflect the need to complete boration by T= 21 hours.

*Justification: This change reflects new analysis completed.*

#### ***In Attachment 3: FLEX Portable Equipment***

In Table "PWR Portable Equipment Phase 2," the "Two (2) FLEX SG Feed Pumps" has been changed to reflect only one is required and will be stored in the ERB.

*Justification: This change reflects a revised strategy location, and number of FLEX SG Feed Pumps*

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

SCE&G 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 generic concerns have been addressed by NEI, accepted by the NRC, and incorporated into the appropriate section of the Overall Integrated Plan:

- Position Paper: Shutdown/Refueling Modes – endorsed by NRC in September 30, 2013 letter to NEI was incorporated into Section 5: Strategy Deployment.
- EPRI Report 3002000623 entitled "Nuclear maintenance Applications Center: Preventive Maintenance Basis for FLEX Equipment" – endorsed by NRC in October 7, 2013 letter to NEI was incorporated into Section 7: Programmatic Controls.
- Westinghouse position paper entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG), – endorsed by NRC in January 8, 2014 letter to NEI was incorporated into Section 11: Maintain RCS Inventory Control.
- Battery Life Issue White Paper – endorsed by NRC in September 16, 2013 letter to NEI was incorporated into Section 14: Safety Function Support.

### **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 attachment.

1. SCE&G'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. SCE&G'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 August 28, 2013.
4. SCE&G'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), dated February 27, 2014.
5. NRC letter to SCE&G "Virgil C. Summer Nuclear Station Unit 1 – Interim Staff Evaluation Related to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies)", dated February 21, 2014.