



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

February 26, 2015  
NOC-AE-15003224  
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U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

South Texas Project  
Units 1 & 2  
Docket Nos. STN 50-498, STN 50-499  
STPNOC Fourth 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 EA-12-049) (TAC Nos. MF0825 and MF0826)

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", March 12, 2012 (ML12073A195)
2. Letter from D.W. Rencurrel, STPNOC, to NRC Document Control Desk, "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)", October 24, 2012 (ML12310A389) (NOC-AE-13002909)
3. Letter from D.L. Koehl, STPNOC, to NRC Document Control Desk, "STPNOC 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)", February 28, 2013 (ML13070A011) (NOC-AE-13002963)
4. Letter from G.T. Powell, STPNOC, to NRC Document Control Desk, "STPNOC First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)", August 26, 2013 (ML13249A060) (NOC-AE-13003027)
5. Letter from G.T. Powell, STPNOC, to NRC Document Control Desk, "STPNOC Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)", February 27, 2014 (ML14073A458) (NOC-AE-14003089)
6. Letter from G.T. Powell, STPNOC, to NRC Document Control Desk, "STPNOC Third Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)(TAC Nos. MF0825 and MF0826)", August 27, 2014 (ML14251A029) (NOC-AE-14003162)
7. Nuclear Energy Institute (NEI) Guidance 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, August 21, 2012 (ML12242A378)

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On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (Reference 1) to South Texas Project Nuclear Operating Company (STPNOC) 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. The purpose of this letter is to provide the fourth six-month status report pursuant to Section IV, Condition C.2, of EA-12-049 delineating progress made in implementing the requirements of EA-12-049. The Attachment included with this letter provides updates to milestone accomplishments since the last status report including any changes to the compliance method, schedule, or need for relief and the associated basis.

Per the requirements of Reference 1, STPNOC submitted an initial status report (Reference 2) and an Overall Integrated Plan (OIP) pursuant to Section IV, Condition C of the Order (Reference 3). STPNOC has submitted three status updates to the Overall Integrated Plan (References 4-6).

Changes and updates made since the issuance of the third status report (Reference 6) are summarized below and described in further detail in the Attachment:

- The Modes 5 and 6 Reactor Coolant System (RCS) Makeup N+1 pump evaluation has been completed. STP will provide an additional pump with the same characteristics as the N pump. The N and N+1 pumps will be located in different compartments (safety trains) in the Fuel Handling Building.
- The NRC audit team conducted the onsite portion of STP's Mitigating Strategies audit February 9-13, 2015. The NRC team identified a need for a compensatory action regarding STP's RCS makeup strategy. The audit team also requested additional details regarding the phase 3 approaches for RCS, Steam Generator (SG) and Spent Fuel Pool (SFP) makeup. A discussion of these issues is provided in Section 4 of this status report.


Direction regarding the content of the status reports is provided in NEI 12-06 (Reference 7).

This letter contains no new regulatory commitments.

If there are any questions regarding this letter, please contact Wendy Brost at (361) 972-8516 or me at (361) 972-7566.

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

Executed on: February 26, 2015



G. T. Powell  
Site Vice President

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Attachment: STP Nuclear Operating Company (STPNOC) Fourth 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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**STP Nuclear Operating Company (STPNOC) Fourth 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

The changes that have been made to our strategies since the previous six-month status report are outlined below:

The RCS will be further depressurized and cooled once Operators isolate or vent the Safety Injection (SI) accumulators. This subsequent cooldown and depressurization will seat the pressure safety valve (PSV) on the Reactor Coolant Pump (RCP) seal return line that is expected to open early in the event due to increased RCP seal leakage. Approximately 13 hours into the event, the PSV is expected to re-seat. Pressurizer level will be restored approximately 23 hours following the event start. At this point, makeup to the RCS will no longer be necessary.

The revised sequence of events timelines are conservatively based on starting the FLEX diesel generator and associated pumps and equipment eight hours following event initiation.

- CORE COOLING/RCS INVENTORY (Modes 5 and 6 without SGs when natural circulation is not available) – The primary strategy (N) uses a 170 gpm @ 100 psi FLEX pump that will be located in the A-Train SI bay in the Fuel Handling Building (FHB). This N pump utilizes the same suction and discharge path as the Modes 1-4 RCS Inventory (Makeup) FLEX pump. The alternate strategy (N+1) for filling the RCS during Modes 5 and 6 uses an identical pump located in the B-Train SI bay in the FHB. The N and N+1 strategies use identical suction and discharge piping in their respective SI bays.
- WATER SUPPLIES
  - RCS Inventory – The Refueling Water Storage Tank (RWST) and Boric Acid (BA) Storage Tanks will be the primary tanks used to makeup to the RCS. During the event, the RCS will be depressurized by the operators in order to stop the loss of coolant via the RCP seal return PSV. A maximum volume of approximately 30,000 gallons of borated water will be required to refill the RCS after seating the PSV. This will not deplete the capacity of the RWST and BA storage tanks.
  - Core Cooling (Modes 1-4) – For external events other than the Design Basis (DB) flood, the Auxiliary Feedwater Storage Tank (AFWST) will be re-filled using a diesel driven pump. The pump used in this strategy will either be a pump brought from the National SAFER Response Center (NSRC) or one of the trailer-mounted pumps stored onsite. The suction source for the pumps can be any one of a number of tanks, basins or the Ultimate Heat Sink, whichever is available. Approximately 24 hours following a DB flood event (fill start time), the water level at the AFWST will be about five feet above ground level. STP plans to modify the Feedwater Deaerator to allow water to be moved via hose and gravity to the AFWST using drain lines in the Auxiliary Feedwater (AFW) system. This will provide sufficient water for continued AFW system operation until the flood waters subside.

The following chart has been developed to aid in understanding the pumps and protection for the strategies:

	SAFETY FUNCTION			
	RCS Inventory (Modes 1-4)	RCS Inventory/ Core Cooling (Shutdown Modes)	Core Cooling (SG Makeup)	SFP Makeup
Primary strategy	Installed Chemical and Volume Control System (CVCS) Positive Displacement Pump (PDP) @ 35 gpm	Pre-staged FLEX RCS Makeup pump @ 170 gpm	Installed Turbine Driven AFW pump (phase 1) and pre-staged FLEX SG Makeup motor driven pump @ 300 gpm (phase 2)	Installed Reactor Makeup Water pump @ 300 gpm
Alternate strategy	Pre-staged FLEX RCS Makeup pump @ 70 gpm	Second pre-staged FLEX RCS Makeup pump @ 170 gpm	Second pre-staged FLEX SG Makeup motor driven pump @ 300 gpm (phase 2)	Pre-staged FLEX SFP makeup pump @ 250 gpm
Protection in accordance with NEI 12-06?	Yes, both inside safety related buildings.	Yes, both inside safety related buildings	Yes, both inside safety related buildings.	Yes, both inside safety related buildings.

Note: The RCS makeup strategy for Modes 1-4 is considered to be an alternate approach to meeting Order EA-12-049. See Section 5 for additional information.

In addition to the pumps described in the table above, STP has two trailer-mounted pumps that can be used to move water as necessary throughout the plant (e.g. tank to tank or basin to tank). The trailer-mounted pumps will be stored in structures that meet the NEI 12-06 guidelines for protection except for protection from a tornado missile. To address this exception, the storage buildings will be sufficiently separated to provide reasonable assurance that a tornado missile cannot destroy both pumps. These pumps cannot be deployed until approximately 53 hours following the DB flooding event.

## 2. Milestone Accomplishments

- The Phase 2 Staffing Assessment has been completed and will be re-verified once the FLEX Support Guidelines become effective.
- The onsite portion of the Mitigating Strategies and Spent Fuel Pool Level Indication audit was completed February 13, 2015.
- Plant modifications for FLEX strategies have been completely evaluated and field installations are ongoing.

### 3. Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP. 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.

<u>Milestone</u>	<u>Target Completion Date</u>	<u>Activity Status</u>	<u>Revised Target Completion Date</u>
Submit 60 Day Status Report	Oct 2012	Complete	None
Submit Overall Integrated Plan	Feb 2013	Complete	None
Submit 6 Month Updates:			
Update 1	Aug 2013	Complete	None
Update 2	Feb 2014	Complete	None
Update 3	Aug 2014	Complete	None
Update 4	Feb 2015	<b>Complete</b>	None
Update 5	Aug 2015	Not Started	-
Update 6	Feb 2016	Not Started	-
Update 7	Aug 2016	Not Started	-
FLEX Strategy Evaluation	Sept 2013	<b>Complete</b>	None
Walk-throughs or Demonstrations	Dec 2014	<b>Started</b>	April 2015
Perform Staffing Analysis	Dec 2013	<b>Complete</b>	None
Modifications:			
Modifications Evaluation	Sept 2013	<b>Complete</b>	None
Unit 1 Design Engineering	Jan 2014	Started	<del>Dec 2014</del> <b>Oct 2015</b>
Unit 1 Implementation Outage	Oct 2015	Not started	-
Unit 2 Design Engineering	Jan 2014	Started	<del>Oct 2014</del> <b>April 2015</b>
Unit 2 Implementation Outage	Apr 2015	Not started	-
Storage (outside PA):			
Storage Design Engineering	Sept 2013	Complete	May 2014
Storage Implementation	Apr 2015	Started	-

<u>Milestone</u>	<u>Target Completion Date</u>	<u>Activity Status</u>	<u>Revised Target Completion Date</u>
FLEX Equipment:			
Procure On-Site Equipment	Jan 2014	Started	June 2015
Develop Strategies with RRC	Oct 2013	Started	<del>Oct 2014</del> <b>April 2015</b>
Procedures:			
PWROG <sup>1</sup> issues NSSS <sup>2</sup> -specific guidelines	Apr 2015	Started	-
Create Site-Specific FSGs <sup>3</sup>	Apr 2015	Started	-
Create Maintenance Procedures	May 2014	<b>Started</b>	Apr 2015
Training:			
Develop Training Plan	May 2014	<b>Complete</b>	Jan 2015
Training Complete	Sept 2014	Started	April 2015
Unit 1 FLEX Implementation	Oct 2015	Started	-
Unit 2 FLEX Implementation	Apr 2015	Started	-
Submit Completion Report	-	<b>Not Started</b>	Oct 2015

<sup>1</sup> PWROG – Pressurized Water Reactor Owner’s Group

<sup>2</sup> NSSS – Nuclear Steam Supply System

<sup>3</sup> FSG –FLEX Support Guidelines

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

Specific changes for the fourth six-month update:

- As previously described in Section 1, the Modes 5 and 6 RCS Makeup N+1 pump is a duplicate of the N pump.
- STP's RCS makeup strategy is an alternate approach because it does not fully meet the requirements of the NEI 12-06 guidance with respect to flexibility. As a compensatory action, STP will reduce the allowed out of service time to 30 days for both the CVCS PDP and the FLEX RCS Makeup pump for Modes 1-4.

The following are clarifications to the phase 3 strategies for RCS, SG and SFP makeup:

- The NSRC turbine generators will be connected to the load side cables of one Engineered Safety Feature (ESF) transformer.
- The NSRC turbine generators will power the Low Head Safety Injection pump for RCS Makeup or SFP Makeup, the CVCS Centrifugal Charging pump for RCS Makeup, and the AFW pump for SG Makeup.
- Portable pumps from the NSRC can be used for SG Makeup and SFP Makeup in phase 3.
- The SG Makeup phase 3 connections are located at ground level at the South end of the Turbine Generator Building.
- For phase 3 SFP Makeup, operators can run pre-staged discharge hoses to the SFP. Note that if the external event involves a DB flood, this strategy cannot be employed until flood waters recede.
- There are no external connections for NSRC pumps to support RCS Makeup in phase 3.

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

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



## 6. Open Items from Overall Integrated Plan, the Draft Safety Evaluation and the Mitigating Strategies Audit

The remaining open items from the OIP and Draft Safety Evaluation are listed below.

OI # 3.2.1.1.A – Demonstrate the applicability of the RETRAN-3D code for analysis of the ELAP transient.

**This open item was closed by the NRC during the onsite portion of the Mitigating Strategies audit.**

OI # 3.2.1.1.B – Provide analysis of the ELAP transient that is applicable to STP and which demonstrates the adequacy of the mitigating strategy proposed for STP. This includes specification of an acceptable definition for the transition to reflux condensation cooling to ensure that the analysis is not credited beyond this juncture. A sufficient number of cases should be included in the analysis to demonstrate the acceptability of different strategies that may be necessary to mitigate an ELAP (e.g., as discussed in Section 3.2.1.6, in some cases “N” and “N+1” pumps have different capabilities, which may substantially affect the sequence of events in the integrated plan).

**STP has submitted results using the RETRAN-3D code and submitted a draft calculation regarding the ELAP analysis with the STP RETRAN model to the NRC during the onsite audit.**

OI # 3.2.1.6.A – Develop the final timeline(s) and sequence(s) of events for STP.

**STP provided an updated timeline of events to the NRC audit team. STP will re-validate the timeline for the tasks involving load shed and then submit the results of the re-validation to the NRC. This action has been entered into the site corrective action database.**

The NRC audit team concluded the onsite portion of the Mitigating Strategies audit with questions regarding STP’s strategy for RCS makeup, revalidation of the event timeline regarding battery load shed, and items involving RCP seals and leakage rates. Any remaining open items from the audit will be included in the next update letter, following the submittal of STP’s Audit Report.

## 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. Letter from D.L. Koehl, STPNOC, to NRC Document Control Desk, "STPNOC 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)", February 28, 2013 (ML13070A011) (NOC-AE-13002963)
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. (ML12054A735) (AE-NOC-12002268)
3. Letter from J.S. Bowen, NRC, to D.L. Koehl, STPNOC, "South Texas Project, Units 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies)", January 29, 2014. . (ML13339A736) (AE-NOC-14002494)
4. Letter from G.T. Powell, STPNOC, to NRC Document Control Desk, "STPNOC Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)", February 27, 2014. (ML14073A458) (NOC-AE-14003089)
5. Letter from G.T. Powell, STPNOC, to NRC Document Control Desk, "STPNOC Third Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) (TAC Nos. MF0825 and MF0826)", August 27, 2014. (ML14251A029) (NOC-AE-14003162)