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

August 27, 2014
NOC-AE-14003162
10 CFR 2.202

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 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 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. 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," August 29, 2012 (ML12233A042)
4. 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)
5. 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)
6. 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)

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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 third 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 of 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) 60-days following issuance of the final Interim Staff Guidance (Reference 3) and an Overall Integrated Plan pursuant to Section IV, Condition C of the Order (Reference 4). STPNOC submitted the first six-month status report on August 26, 2013 (Reference 5) and the second six-month status report on February 27, 2014 (Reference 6).

Changes made since the issuance of the second status report are summarized below and described in further detail in the Attachment:

- The alternate Reactor Coolant System (RCS) Inventory (Modes 1-4) pump will be rated at 70 gpm instead of the original 40 gpm.
- The alternate RCS Inventory/Core Cooling strategy for shutdown modes is being reevaluated. The Boric Acid pump will not work for this strategy as previously thought.
- The alternate Core Cooling Steam Generator (SG) Makeup pump will be pre-staged in the same building as the FLEX pump for the primary strategy in a separate bay/ train. This second pump will provide the same flow and pressure as the first.
- Three Open Items have been updated. One Open Item has been closed.

Direction regarding the content of the status reports is provided in NEI 12-06.

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: August 27, 2014

G. T. Powell
Site Vice President

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Attachment: South Texas Project Nuclear Operating Company (STPNOC) 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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STP Nuclear Operating Company (STPNOC) 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

1. Introduction

STPNOC developed an Overall Integrated Plan (OIP) (Reference 1) documenting the diverse and flexible strategies (FLEX), in response to Order EA 12-049 (Reference 2). This Attachment provides the third update of milestone accomplishments since submittal of the OIP, including any changes to the compliance method, schedule, or need for relief or relaxation and the associated basis. Several changes have been made to the OIP and the following is a brief overview of STP's current strategies to meet the requirements of the Order. Note that all flow rates and pressures listed are approximate values.

The overall strategic plan is as follows:

If the Extended Loss of AC Power (ELAP) occurs while the Steam Generators (SGs) are being utilized as the heat sink, the Turbine Driven Auxiliary Feedwater (TDAFW) pump will start automatically and feed one SG. Operators will then manually line up feedwater to all SGs. Operators will cooldown and depressurize the plant to a predetermined SG pressure, ensuring that the cooldown will not result in a return to criticality event nor allow nitrogen into the Reactor Coolant System (RCS) from the Safety Injection (SI) accumulators. Cooldown and depressurization should start during the first hour following the initial event.

Once the cooldown begins, site personnel will begin to focus on starting the FLEX diesel generators and mechanically and electrically aligning the FLEX equipment to be placed in service. After approximately eight hours, one of the FLEX diesel generators will be providing power to an RCS makeup pump permitting boric acid to be added to the RCS to maintain shutdown margin. During this time two battery chargers will be powered to begin recharging two of the Class 1E batteries.

The RCS will be further depressurized and cooled once Operators isolate or vent the SI accumulators. This subsequent cooldown and depressurization will seat the pressure relief valve (PRV) on the Reactor Coolant Pump (RCP) seal return line that should have opened due to the increased RCP seal leakage early in the event. At about 15 hours into the event, the PRV should be re-seated. Pressurizer level will be restored and makeup to the RCS will no longer be necessary at approximately 22 hours following event start.

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

- FLEX POWER – Two 480V AC, 1000 kW diesel generators (N and +1) will be staged on the Mechanical Auxiliary Building (MAB) roof of each unit in an enclosure that protects them from external hazards.

- REACTOR COOLANT SYSTEM (RCS) INVENTORY (Modes 1-4) – The primary strategy for filling the RCS will use a 35 gpm Chemical and Volume Control System (CVCS) Positive Displacement pump (PDP) @ 3100 psig taking suction on either the

Boric Acid Tanks (BATs) or the Refueling Water Storage Tank (RWST) and discharging into the CVCS charging line. The alternate means of filling the RCS (or +1) is a pre-staged 70 gpm FLEX RCS Makeup pump @ 700 psi installed in one of the SI pump bays located in the Fuel Handling Building (FHB). Suction is from the RWST, discharging into the SI line downstream of High Head SI discharge motor-operated valve (MOV). The pump size has changed from 1600 psig discharge pressure to 700 psig to reduce the physical size of the pump. STP has the ability to vent the reactor head thus allowing the use of this smaller head pump.

- CORE COOLING (Modes 1-4) – Initial core cooling is accomplished using the TDAFW pump. In the event the TDAFW pump is lost, the primary strategy for cooling the core is a new 300 gpm @ 500 psig pre-staged motor-driven FLEX SG Makeup pump located in the Isolation Valve Cubicle (IVC) that will take suction from the Auxiliary Feedwater Storage Tank (AFWST) and discharge into the cross-connect header that feeds all four SGs. The +1 for this function is provided by an additional FLEX pump staged in a different IVC bay/train than the N pump. Both pumps are sized the same and take their suction from the same AFWST and discharge into the same Auxiliary Feedwater (AFW) header at different locations.

- CORE COOLING/RCS INVENTORY (Modes 5 and 6 without SGs when natural circulation is not available) – The primary strategy uses a 170 gpm @ 100 psi FLEX pump that will be located in the FHB SI pump bays. It will use the identical suction and discharge path as the Modes 1-4 RCS Inventory (Makeup) FLEX pump. The alternate means of filling the RCS is still being evaluated.

- SPENT FUEL POOL (SFP) MAKEUP AND SPRAY – There are 3 different makeup means required in the guidance:
  - The normal makeup mode will be using a Reactor Makeup Water (RMW) pump through valve FC-0048 to fill the SFP.
  - The hose to the pool method will be a 250 gpm @ 150 psi pre-staged FLEX SFP Makeup pump in the FHB. Hose fittings will be installed on the end of the pipe and temporary hoses will be staged in the area. Hoses will be routed from this location to the SFP. This FLEX pump suction is from the RWST.
  - The spray method uses this same above mentioned pump but hoses are routed to the monitors on the south end of the SFP deck.

- WATER SUPPLIES
  - RCS Inventory – RWST and Boric Acid Storage tanks will be the primary tanks used to makeup to the RCS. The tanks will not deplete because of the new strategy of depressurizing the RCS to the point that the loss of coolant via the RCP seal return pressurized safety valve (PSV) will stop. Thus, not more than 70,000 gallons should be needed to refill the RCS following seating the PSV.
  - Core Cooling (Modes 1-4) – For external events other than the Design Basis (DB) flood from a Reservoir embankment breach, the AFWST will be re-filled using a diesel driven pump from the Regional Response Center (RRC) or using one of STP's trailer mounted diesel driven pumps. The suction source can be any one of a number of tanks, basins or the Ultimate Heat Sink, whichever is available. For the DB flood from a Reservoir embankment breach, water level

around the AFWST at about 30 hours (fill start time) into the event will still be approximately five feet deep. A modification to the Feedwater Dearator will allow its water to be moved via hose and gravity to the AFWST via drain lines in the AFW system. This will provide enough water for continued AFW system running until the flood waters subside.

- Core Cooling (shutdown) - RWST will be the primary tank used to makeup to the RCS. Following depletion of this tank STP can fill the RWST from other on site tanks, basins or main reservoirs using th12516e trailer mounted diesel driven pump.
- SFP makeup and spray –
  - For normal makeup, the source is the RMW Storage Tank.
  - For makeup with hoses, the source is the RWST.
  - For makeup with spray, the source is the RWST with outside basins and tanks as backup.
  - STP can fill the RWST with non-borated water as discussed above.

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

	FUNCTION			
	RCS Inventory (Modes 1-4)	**RCS Inventory/ Core Cooling (Shutdown Modes)**	**Core Cooling (SG Makeup)**	**SFP Makeup**
Primary strategy	Installed CVCS PDP @ 35 gpm	Pre-staged FLEX RCS Makeup @ 170 gpm	Installed TDAFW 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 @ 70 gpm	Currently being evaluated	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.	N pump inside safety related building, alternate strategy being evaluated.	Yes, both inside safety related buildings.	Yes, both inside safety related buildings.

Note: Two trailer mounted pumps will be stored in structures that meet NEI 12-06 protection guidelines with the exception of a tornado missile. The buildings will be separated sufficiently to provide reasonable assurance that a tornado missile should not destroy both pumps. Deployment following a design basis flood from the MCR embankment breach cannot take place until about 53 hours following event. These pumps will be used to move water as necessary throughout the plant (e.g. tank to tank or basin to tank).

2. Milestone Accomplishments

STP has no milestone accomplishments to discuss at this time.

3. Milestone Schedule Status

The following provides an update to Attachment 2 of the OIP including the updated activity status of each item and whether the expected completion date has changed. The dates listed are planning dates which are subject to change as design and implementation details are developed.

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

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
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	Not Started	-
Update 5	Aug 2015	Not Started	-
Update 6	Feb 2016	Not Started	-
Update 7	Aug 2016	Not Started	-
FLEX Strategy Evaluation	Sept 2013	Started	Nov 2014
Walk-throughs or Demonstrations	Dec 2014	Not started	April 2015
Perform Staffing Analysis	Dec 2013	Started	Dec 2014
Modifications:			
Modifications Evaluation	Sept 2013	Started	Sept 2014
Unit 1 Design Engineering	Jan 2014	Started	Dec 2014
Unit 1 Implementation Outage	Oct 2015	Not started	-
Unit 2 Design Engineering	Jan 2014	Started	Oct 2014
Unit 2 Implementation Outage	Apr 2015	Not started	-

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Storage:			
Storage Design Engineering	Sept 2013	Complete	May 2014
Storage Implementation	Apr 2015	Started	-
FLEX Equipment:			
Procure On-Site Equipment	Jan 2014	Started	June 2015
Develop Strategies with RRC	Oct 2013	Started	Oct 2014
Procedures:			
PWROG[1] issues NSSS[2]-specific guidelines	Apr 2015	Complete	August 2013
Create Site-Specific FSGs[3]	Apr 2015	Started	-
Create Maintenance Procedures	May 2014	Not Started	Oct 2015
Training:			
Develop Training Plan	May 2014	Started	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	-	Started	Oct 2015

[1] PWROG – Pressurized Water Reactor Owner's Group

[2] NSSS – Nuclear Steam Supply System

[3] FSG – Functional Safety Guidelines

4. Changes to Compliance Method

Specific changes to the second six-month status update (Reference 4):

1. The strategy for the +1 Core Cooling pump (SG Makeup) has been changed. STP will purchase and install a pump identical to the N pump for this function. This second SG Makeup pump will be installed in a different IVC bay/train than the N pump in the same protected safety related building.

2. The RCS Makeup pump will provide a higher flow rate than originally planned - It will provide 70 gpm @ 700 psig.

3. The Core Cooling +1 strategy for shutdown modes is being reevaluated.

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

The NRC identified two open items (3.1.2.2.A and 3.2.4.8.B) in the Interim Staff Evaluation that require justification for their approach to meeting the order. 3.1.2.2.A is discussed below in Section 6 and 3.2.4.8.B was discussed in the prior six-month update (Reference 4).

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

Below are the open items from the Technical Evaluation Report (Reference 3):

OI # 3.1.2.2.A – The licensee does not provide for transportation/deployment of the diesel driven trailer mounted pump relied upon as a spare SG makeup pump in the event of a design basis flood.

The strategy for the +1 Core Cooling (SG Makeup) pump has been changed. STP plans to purchase and install a pump identical to the N pump to perform this function. This second SG Makeup pump will be installed in a different bay/train than the N pump in the same protected safety related building.

With this change in strategy, STPNOC considers this deployment issue closed.

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

STP provided a white paper to the NRC on June 12, 2014 regarding this OI. An updated white paper will be provided following the incorporation of comments received from the NRC staff.

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 preliminary results using the RETRAN-3D code. Results will be provided to the NRC once all comments from the white paper submitted for OI # 3.2.1.1.A have been incorporated.

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

No update

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 – Iterim 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)