



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

August 7, 2003
NOC-AE-03001569
10CFR50

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Rockville, MD 20852

South Texas Project
Units 1 and 2
Docket No. STN 50-498, STN 50-499
60 Day Response to Bulletin 2003-01

References: NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003.

The U. S. Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2003-01 to inform licensees of the potential for additional adverse effects due to debris blockage of flowpaths necessary for Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation and containment drainage. These additional adverse effects were based on NRC-sponsored research that identified the potential susceptibility of pressurized-water reactor (PWR) recirculation sump screens to debris blockage in the event of a high energy line break (HELB) that would require ECCS and CSS operation in the recirculation mode.

All licensees were requested to provide a response within 60 days of the date of the NRC Bulletin to either: 1) State that the ECCS and CSS recirculation functions have been analyzed with respect to the potentially adverse post-accident debris blockage effects identified in the NRC Bulletin and are in compliance with 10 CFR 50.46(b)(5) and all existing applicable regulatory requirements (Option 1), or 2) Describe any interim compensatory measures that have been or will be implemented to reduce the risk which may be associated with the potentially degraded or nonconforming ECCS and CSS recirculation functions until an evaluation to determine compliance has been completed (Option 2).

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The attachment to this letter contains the STPNOC response in accordance with Option 2 of the information requested in U. S. Nuclear Regulatory Commission (NRC) Bulletin 2003-01.

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

Executed on: August 7, 2003



Thomas S. Jordan
Vice President,
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Attachment: Response to NRC Bulletin 2003-01

cc:

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Response to NRC Bulletin 2003-01

This response addresses Option 2 of the Requested Information in NRC Bulletin 2003-01. This response discusses: 1) interim compensatory measures that have been implemented, 2) interim compensatory measures that will be implemented, 3) measures discussed in the bulletin that will not be implemented and the justification for not implementing them, and 4) implementation schedule for planned interim measures and basis for concluding that their implementation is not practical until a later date.

1) Interim compensatory measures that have been implemented

STPNOC has established a number of actions in its existing procedures that may be credited as compensatory measures that are already in place. These are described below as they pertain to the actions recommended in the bulletin.

- **Procedure actions that delay RWST inventory depletion**

Guidance to delay depletion of the Refueling Water Storage Tank (RWST) after switchover to sump recirculation is currently contained in Emergency Operating Procedure OPOP05-EO-EC11, "Loss of Emergency Coolant Recirculation". This procedure provides actions to reduce the outflow from the RWST to preserve the RWST inventory once it has been determined that a loss of sump recirculation capability exists. EC11 establishes a process to determine the actions for delaying RWST inventory depletion, while ensuring adequate core cooling flow and containment heat removal as necessary.

For small to medium LOCAs, guidance to delay depletion of the RWST before switchover to sump recirculation currently exists in procedure OPOP05-EO-ES12, "Post LOCA Cooldown and Depressurization". This procedure provides actions to cooldown and depressurize the RCS to reduce the break flow, thereby reducing the injection flow necessary to maintain RCS subcooling and inventory. The operating high head safety injection (HHSI) pumps are sequentially stopped to reduce injection flow, based on pre-established criteria that maintain core cooling, resulting in less outflow from the RWST. For smaller LOCAs, it is possible to cooldown and depressurize the reactor coolant system (RCS) to cold shutdown conditions before the RWST is drained to the switchover level. Therefore cold leg recirculation is not required to be established, and sump blockage is not an issue.

- **Ensuring that alternative water sources are available to refill the RWST or to otherwise provide inventory to inject into the reactor core and spray into the containment atmosphere**

RWST refill is not an assumed evolution in the STP safety analyses and plant design bases. However, post accident response instructions to refill the RWST, once it has been determined a loss of ECCS recirculation capability exists, are provided in OPOP05-EO-EC11, "Loss of Emergency Coolant Recirculation".

Procedure OPOP05-EO-EC11 actions provide guidance that results in reducing outflow from the RWST. The following actions may be taken to address degraded ECCS recirculation flow, which may be caused by the containment recirculation sump clogging:

- stopping Containment Spray Pumps not needed for containment pressure control,
- reducing ECCS flow to the minimum required for decay heat removal,
- adding makeup to the RWST, and
- injecting makeup into the RCS from alternate sources

In addition, the RWST level is normally maintained at a nominal level from 490,000 to 500,000 gallons. This RWST level assures capacity above the Technical Specification 3.5.5 minimum required volume of 458,000 gallons, and is also above the current low alarm level of 473,000 gallons.

- **More aggressive containment cleaning and increased foreign material controls**

STPNOC's procedures for establishing and maintaining containment cleanliness are effective barriers for controlling loose debris and potential sources of loose debris. Procedures OPSP03-XC-0002 "Initial Containment Inspection To Establish Integrity" and OPSP03-XC-0002A "Partial Containment Inspection (Containment Integrity Established)", Visual Inspection of Containment for Loose Debris" are applied to assure containment cleanliness.

OPSP03-XC-0002 is performed prior to entering MODE 4 during plant startup. OPSP03-XC-0002 details a visual inspection of all accessible areas of Containment prior to establishing Containment Integrity to verify no loose debris is present which could be transported to the Containment Sump and cause restriction of pump suctions during LOCA conditions. Actions performed in the course of this procedure include an elevation-by-elevation check to confirm the absence of loose debris that could clog the sump and confirmation that all temporary storage box lids are in place and secured and all tool cabinet doors are closed and secured.

Once OPSP03-XC-0002, "Initial Containment Inspection to Establish Integrity", has been initiated to verify containment conditions for transition from Mode 5 to Mode 4, then procedure OPSP03-XC-0002A "Partial Containment Inspection (Containment Integrity Established)" is performed for containment entries that are NOT under the control of

0PSP03-XC-0002. 0PSP03-XC-0002A maintains validity of the in-progress or completed requirements of 0PSP03-XC-0002 for transition to Mode 4. This procedure may be performed prior to commencing 0PSP03-XC-0002 to aid in establishing controls for RCB work activities in preparation for establishing Containment Integrity.

0PSP03-XC-0002A is also performed after Containment Integrity is established for visual inspection of the affected areas within Containment at the completion of each Containment entry to verify no loose debris is present which could be transported to the Containment Sumps and cause restriction of pump suction during LOCA conditions.

When Containment Integrity is established or being established, these procedures apply to all entries into the Containment. They are performed under the direction of the Shift Supervisor. All Containment entries require a pre-job briefing, which is typically performed by a Senior Reactor Operator, that addresses the requirements for Containment cleanliness, the definition of loose debris, and reinforces a high level of expectations for housekeeping and control of material. The individuals who conducted the briefings during the recent restart of STP Unit 1 were updated with the information from Bulletin 2003-01.

The process of performing containment cleanup prior to restart is a focused effort with experienced individuals assigned responsibility for areas of the containment. In-process walk-downs are performed by station management and Operations and a final acceptance walk-down is performed by Operations to confirm all requirements for Containment Integrity are met. STPNOC has a high level of confidence in the process to assure the containment building is free of loose debris.

- **Ensuring containment drainage paths are unblocked**

STP procedures require confirmation that the flanged flow paths that allow drainage from the reactor cavity are open. In addition, the process of restoring Containment Integrity, including the performance of the XC-0002/2A inspections provides assurance that the Containment meets its design basis configuration.

- **Ensuring sump screens are free of adverse gaps and breaches**

STP surveillance procedure requirements call for the sumps to be inspected during each refueling. The STP Unit 1 sump screens were inspected prior to restart from its recent bottom-mounted instrumentation forced outage and found to be acceptable. The Unit 2 sump screens were also inspected during its Fall 2002 outage and found to be acceptable.

2) Interim compensatory measures that will be implemented

- **Operator training on indications of and responses to sump clogging**

Information regarding the issues identified in NRC Bulletin 2003-01 will be provided to Operations Department Control Room personnel. The information describes the reasons for the bulletin and interim compensatory measures taken and planned at STP as a result of the bulletin. The information also raises Operator awareness of instrumentation that may provide indications of potential sump blockage.

Indications of pump cavitation or loss of nominal pump suction head (NPSH) such as erratic current, flow or discharge pressure can indicate a loss of or degraded suction supply, such as that caused by containment recirculation sump clogging. ECCS and Containment Spray Pump flow and discharge pressure can be monitored for indications of containment sump clogging following establishment of recirculation flow. Specific indications available for operators include:

- SI / CS Pump Flow
- SI / CS Pump Discharge Pressure

The indications and consequences of a degraded containment sump condition at STP have been reviewed for impact to operator training. Licensed Operator Training includes the monitoring of operating ECCS and Containment Spray System pumps during the evolution for transfer to cold leg recirculation (OPOP05-EO-ES13, "Transfer To Cold Leg Recirculation") and hot leg recirculation (OPOP05-EO-ES14, "Transfer To Hot Leg Recirculation"). Operator training also includes actions required on a total loss of Emergency Sump recirculation capability (OPOP05-EO-EC11, "Loss of Emergency Coolant Recirculation"). Operator training currently includes the recognition of indications of pump distress or loss of NPSH, such as erratic current, flow or discharge pressure. In order to enhance Licensed Operator Training material to provide specifics of this bulletin, Initial Licensed Operator training material will be modified to include the indications of sump clogging. Specifics from this bulletin will be added to the training material for Emergency Operating Procedure (EOP) performance of switchover activities and loss of Emergency Sump recirculation capability response.

Operator actions required to respond to Emergency Sump clogging are currently trained on a biennial basis in the Licensed Operator Requal program. Simulator training objectives are trained every two years on the topics of transfer to cold leg recirculation, transfer to hot leg recirculation, and total loss of Emergency Sump recirculation capability.

Specific classroom training on indications of and responses to sump clogging will be developed and provided for the licensed operators as part of the next available licensed operator training cycle. NRC Bulletin 2003-01 will be utilized as a reference to highlight the concerns and discuss plant responses to the bulletin.

3) Measures discussed in the bulletin that will not be implemented and the justification for not implementing them

Procedural modifications, if appropriate, that would delay the switchover to containment sump recirculation (e.g., shutting down redundant pumps that are not necessary to provide required flows to cool the containment and reactor core, and operating the CSS intermittently)

Procedure actions that delay the switchover to containment sump recirculation

The Westinghouse Owners Group (WOG) is evaluating Emergency Response Guidelines (ERGs) for possible procedure changes that will affect switchover. Until future ERG changes can be fully evaluated, the possibility for inadvertently increasing risk is real and undesirable. STPNOC will consider changes once the WOG has provided more information defining exactly what procedural changes reduce risk while improving sump performance. Additionally the WOG has put forth the following information as justification for this conclusion:

Note, for larger LOCAs that require ECCS injection flow and CSS spray, pre-emptive operator actions to stop pumps or throttle flow solely for the purpose of delaying switchover to containment sump recirculation are not recommended until the impact of the changes can be evaluated on a generic basis for the following reasons:

- Operator actions to stop ECCS or CSS pumps or throttle flow may result in conditions that are either outside of the design basis safety analyses assumptions or violate the design basis safety analyses assumptions (single failure). This would result in the potential for creating conditions that would make the optimal recovery more challenging (e.g., stopping containment spray impacts containment fission product removal, containment sump pH and equipment environment qualification design basis requirements).
- These actions would be inconsistent with the overall WOG ERG philosophy. The WOG ERGs are symptom-based procedures that provide for the monitoring of plant parameters and prescribe actions based on the response of those parameters. To avoid the risk of taking an incorrect action for an actual event, the WOG ERGs do not prescribe contingency actions until symptoms that warrant those contingency actions are identified.
- These actions would be inconsistent with the current operator response using the WOG ERGs that has been established through extensive operator training. The expected operator response is based on the optimal set of actions considering both design basis accidents and accidents outside the design basis. The WOG ERG operator response is not limited to a specific accident progression in order to provide optimal guidance for a wide range of possible accidents.

- To be effective in delaying the switchover to containment sump recirculation, operator actions to stop ECCS or CSS pumps must be taken in the first few minutes of an accident. This introduces a significant opportunity for operator errors based on other actions that may be required during this time frame. Any new operator actions to stop ECCS or CSS pumps, when modeled in the PRA, are likely to result in increased risk due to operator error.

Based on the philosophy adopted in the current WOG ERGs to take actions based on plant symptoms, it is more appropriate to address actions to "delay RWST inventory depletion" once the loss of recirculation capability is diagnosed. Any generic changes to the WOG ERGs will be evaluated as part of an Owners Group program.

4) Implementation schedule for planned interim measures and basis for concluding that their implementation is not practical until a later date

1. Information regarding the issues identified in NRC Bulletin 2003-01 will be provided to Operations Department Control Room personnel by September 30, 2003. This is a short term action and the schedule is acceptable based on the already strong STP programs and the low likelihood of an event that would challenge the sumps.
2. Initial Licensed Operator training material will be modified to include the indications of sump clogging as part of the training administered for Emergency Operating Procedure (EOP) performance of switchover activities by March 31, 2004. Operators are already generally familiar with the indications of loss of pump suction and the due date reflects a reasonable time to develop the training material.
3. Classroom training will be conducted for the licensed operators starting in the next available operator training cycle and is scheduled for completion by December 31, 2003. This date is based on the regularly scheduled Operator training program and is consistent with the implementation dates for Actions 1 and 2.